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OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

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OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

December 20, 1983 Volume 1037 Number 3

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.

THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.

GENERAL INFORMATION concerning PATENTS.

GENERAL INFORMATION concerning TRADEMARKS.

PRINTED COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.00 each; PLANT PATENTS in color, $8.00 each; copies of TRADEMARKS at $1.00 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty Information

For information concerning the PCT member countries see the notice appearing in the Official Gazette at 1017 O.G. 10 on Apr. 13, 1982. For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States, see the notice in the Official Gazette of Sept. 28, 1982 at 1022 O.G. 52.

Note that the domestic PCT fees have been increased as of Oct. 1, 1982 by a rule change to 37 CFR 1.445 that was published at 1021 O.G. 11 on Aug. 10, 1982. Also note that the international PCT fees have changed as of Jan. 1, 1983 and the Search Fee for the European Patent Office as Searching Authority changed as of Jan. 22, 1983. The notice regarding the change in international fees and the Search Fee for the European Patent Office appeared at 1025 O.G. 27, on 28 Dec. 1982. The current schedule of fees is as follows:

Transmittal fee	$ 125.00
Search fee	
U.S. Patent and Trademark Office as Searching Authority	
· No corresponding prior U.S. national application filed	500.00
· Corresponding prior U.S. national application filed	250.00
European Patent Office as Searching Authority	
· All cases	670.00
International Fees	
Basic Fees (first 30 pages)	265.00
Basic Supplemental Fee (for each page over 30)	5.00
Designation fee (for each national or regional office)	65.00

GERALD J. MOSSINGHOFF,
Commissioner of Patents and Trademarks.

Dec. 3, 1982.

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

4,281,535, Re. S.N. 515,546, Filed July 20, 1983, Cl. 73/49.8, CYLINDER GRIPPING APPARATUS, William E. Wesch, Jr., Owner of Record: *Inventor,* Attorney or Agent: Emil J. Bednar, et al., Ex. Gp.: 244

4,294,787, Re. S.N. 541,566, Filed Oct. 13, 1983, Cl. 264/46.6, METHOD OF PRODUCING REINFORCED COMPOSITE RACKET FRAME, Kun Nan Lo, Owner of Record: *Inventor,* Attorney or Agent: Richard P. Berg, Ex. Gp.: 147

4,295,340, Re. S.N. 543,468, Filed Oct. 19, 1983, Cl. 62/82, REFRIGERATED DISPLAY CASE HAVING AMBIENT AIR DEFROST, Fayez F. Ibrahim, Owner of Record: *Tyler Refrigeration Corp., Niles, Mich.,* Attorney or Agent: Henry Shur, et al., Ex. Gp.: 344

4,295,472, Re. S.N. 542,822, Filed Oct. 17, 1983, Cl. 128/690, HEART RATE MONITOR, John M. Adams, Owner of Record: *Medtronic, Inc., Minneapolis, Minn.,* Attorney or Agent: Reed A. Duthler, et al., Ex. Gp.: 335

4,381,825, Re. S.N. 541,701, Filed Oct. 13, 1983, Cl. 175/393, DRILL BIT NOZZLE, Robert P. Radtke, Owner of Record: *Strata Bit Corp., Houston, Tex.,* Attorney or Agent: William L. Mathis, et al., Ex. Gp.: 356

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.21(b)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

3,379,273, Reexam. No. 90/000,465, Requested: Oct. 31, 1983, Cl. 367/144, POWERFUL SOUND IMPULSE GENERATION METHODS AND APPARATUS, Steven V. Chelminski, Owner of Record: *Bolt Technology Corp., South Norwalk, Conn.,* Attorney or Agent: Roland T. Bryan, Ex. Gp.: 220, Requester: Mark Precision Corp., Houston, Tex.

4,302,920, Reexam. No. 90/000,463, Requested: Oct. 28, 1983, Cl. 53/399, FILM WEB DRIVE STRETCH WRAPPING APPARATUS AND PROCESS, Patrick R. Lancaster, et al., Owner of Record: *Lantech, Inc., Louisville, Ky.,* Attorney or Agent: Gipple & Hale, Ex. Gp.: 170, Requester: Lantech, Inc., Louisville, Ky.

Service by Publication

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceedings sent by certified mail to each registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives, shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

All That Glitters, Inc. (a Corporation of the State of North Carolina), Charlotte, N.C. Reg. No. 1,096,329, for the mark "ALL THAT GLITTERS," Can. No. 13,329.

Marquay, S.a.r.l., New York, N.Y. Reg. No. 767,970, for the mark "MONSIEUR MARQUAY," Can. No. 13,718.

ERMA S. BROWN,
Deputy Clerk, Trademark Trial and Appeal Board.
For MARGARET M. LAURENCE,
Assistant Commissioner for Trademarks.

Transmittals for Use of Deposit Accounts

When statutory fees are to be charged to a deposit account, the processing of the application can be facilitated by submitting the applicant's transmittal letter or other correspondence specifying the account to be charged in triplicate. Submission of these documents in triplicate will eliminate the need for the Mail Room to photocopy the document and thereby reduce the processing time of incoming mail.

THERESA A. BRELSFORD,
Assistant Commissioner for Administration.

Nov. 21, 1983.

Inadvertently Issued Registration Numbers

Effective Jan. 3, 1984, a new subsection identified as "Inadvertently Issued Registration Numbers" will exist as the last category of cancellations listed under the "Trademark Registrations Canceled" section of the *Official Gazette*.

This new sub-section will provide public notice of the cancellation of registration numbers which have been inadvertently issued by the Patent and Trademark Office.

MARGARET M. LAURENCE,
Nov. 15, 1983. *Assistant Commissioner for Trademarks.*

Errata

The following registration numbers were inadvertently canceled in the "Trademark Registrations Canceled, Section 8" section of the Official Gazettes listed below:

1,002,154	TM331	Mar. 8, 1983
1,053,694	TM487	June 28, 1983
1,061,168	TM294	Aug. 9, 1983
1,035,536	TM142	Aug. 2, 1983
1,045,723	TM452	Feb. 15, 1983
1,061,798	TM431	Aug. 16, 1983
1,061,953	TM376	Oct. 18, 1983
1,064,340	TM355	Sept. 20, 1983
1,065,190	TM122	Oct. 4, 1983
1,067,166	TM119	Nov. 1, 1983
1,034,827	TM592	July 27, 1982
1,032,578	TM748	June 29, 1982
1,067,643	TM243	Nov. 8, 1983
1,055,436	TM591	May 31, 1983
1,065,957	TM247	Oct. 11, 1983

Consequently, the above-identified registrations are still active.

MARK M. NEWMAN,
Nov. 15, 1983. *Director, Trademark Examining Operation.*

Errata

The following registration number, listed in the "Trademark Registrations Issued" section of the *Official Gazette* of Oct. 11, 1983 was inadvertently issued:

1,253,539	TMOG	Oct. 11, 1983

Consequently, the certificate of registration bearing the above-identified number was not issued on the date indicated, and this registration number has been vacated.

MARK M. NEWMAN,
Nov. 15, 1983. *Director, Trademark Examining Operation.*

Errata

The following registration number, listed in the "Trademark Registrations Issued" section of the *Official Gazette* of Nov. 1, 1983 was inadvertently issued:

1,256,417	TMOG	Nov. 1, 1983

Consequently, the certificate of registration bearing the above-identified number was not issued on the date indicated, and this registration number has been vacated.

MARK M. NEWMAN,
Nov. 15, 1983. *Director, Trademark Examining Operation.*

PATENT NOTICES

Certificates of Correction for the Week of Dec. 20, 1983

D. 260,733	4,373,617	4,395,179	4,403,209
D. 270,536	4,375,947	4,395,260	4,403,414
3,922,163	4,378,649	4,395,373	4,403,614
4,117,436	4,379,788	4,395,520	4,403,785
4,272,880	4,379,789	4,395,595	4,403,872
4,283,753	4,380,309	4,396,513	4,404,329
4,301,256	4,380,508	4,397,094	4,404,542
4,305,856	4,380,536	4,397,166	4,404,942
4,312,875	4,382,874	4,397,313	4,405,929
4,321,796	4,383,490	4,397,314	4,406,099
4,323,567	4,384,347	4,397,343	4,406,254
4,326,989	4,384,790	4,397,442	4,406,901
4,330,671	4,384,797	4,397,640	4,406,955
4,332,481	4,385,176	4,399,573	4,407,107
4,334,058	4,385,328	4,399,796	4,407,175
4,343,986	4,385,480	4,400,550	4,407,278
4,344,888	4,388,233	4,400,673	4,407,649
4,345,191	4,389,669	4,401,072	4,407,875
4,356,005	4,390,628	4,401,282	4,408,264
4,357,372	4,390,940	4,401,373	4,408,422
4,362,382	4,391,367	4,401,454	4,409,108
4,363,102	4,391,734	4,401,501	4,409,228
4,364,595	4,391,922	4,401,523	4,409,361
4,367,286	4,392,894	4,402,512	4,409,429
4,370,049	4,393,025	4,402,878	4,409,792
4,371,897	4,394,825	4,403,026	4,410,286

Disclaimer

4,150,897.–*Thomas E. Roberts, Jr.*, Saratoga; *James L. Wiederrich*, Lodi; *Melvin H. Lill*, San Jose; and *Andrew K. Chang*, Malibu, Calif. WHEEL-MOUNTED VEHICLE WHEEL ALIGNER. Patent dated Apr. 24, 1979. Disclaimer filed Nov. 3, 1983, by the assignee, *FMC Corp.*

Hereby enters this disclaimer to claims 3, 4, 5, 6, 7 and 17 of said patent.

Disclaimer and Dedication

3,516,898.—*Richard L. Cook*, Phoenix, Ariz. HARD FACED PLASTIC ARMOR. Patent dated June 23, 1970. Disclaimer and Dedication filed Oct. 14, 1983, by the assignee, *Goodyear Aerospace Corp.*

Hereby disclaims and dedicates to the Public the term of this patent subsequent to Aug. 8, 1983.

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The libraries listed herein, designated as patent depository libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent months or years in some libraries to all or most of the patents issued since 1870, or earlier, in other libraries.

These patent collections are open to public use and each of the patent depository libraries, in addition, offers the publications of the patent classification system (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Depending upon the library, the patents may be available in microfilm, in bound volumes of paper copies, or in some combination of both. Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the patent depository libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 826-4500 Ext.21
	Birmingham Public Library	(205) 254-2555
Arizona	Tempe: Science Library, Arizona State University	(602) 965-7140
California	Los Angeles Public Library	(213) 626-7555 Ext. 273
	Sacramento: California State Library	(916) 322-4572
	Sunnyvale: Patent Information Clearinghouse*	(408) 738-5580
Colorado	Denver Public Library	(303) 571-2122
Delaware	Newark: University of Delaware	(302) 738-2238
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
Illinois	Chicago Public Library	(312) 269-2865
Indiana	Indianapolis—Marion County Public Library	(317) 269-1706
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Massachusetts	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library & Information Center	(612) 372-6570
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 390, Ext. 391
Nebraska	Lincoln: University of Nebraska-Lincoln, Engineering Library	(402) 472-3411
Nevada	Reno: University of Nevada Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7815
New York	Albany: New York State Library	(518) 474-5125
	Buffalo and Erie County Public Library	(716) 856-7525 Ext. 267
	New York Public Library (The Research Libraries)	(212) 930-0850
North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
Ohio	Cincinnati & Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 422-6286
	Toledo/Lucas County Public Library	(419) 255-7055 Ext. 212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 624-6546
Pennsylvania	Cambridge Springs: Alliance College Library	(814) 398-2098
	Philadelphia: Franklin Institute Library	(215) 448-1321**
	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 521-7722 Ext. 226
South Carolina	Charleston: Medical University of South Carolina	(803) 792-2372
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
Texas	Austin: McKinney Engineering Library, University of Texas	(512) 471-1610
	Dallas Public Library	(214) 749-4176
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Engineering Library, University of Wisconsin	(608) 262-6845
	Milwaukee Public Library	(414) 278-3043

All of the above-listed libraries offer CASSIS (Classification And Search Support Information System), which provides direct, on-line access to Patent and Trademark Office data.

*Collection organized by subject matter.

**Call only between the hours of 10:00 a.m. and 5:00 p.m.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF April 2, 1983

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action

CHEMICAL EXAMINING GROUPS

GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—D. E. TALBERT, Director 1-16-81
Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metallurgical Apparatus; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.

GENERAL ORGANIC CHEMISTRY, GROUP 120—C. E. VAN HORN, Director 11-20-81
Heterocyclic Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.

HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—J. O. THOMAS, JR., Director 3-1-82
Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g., Coating; Molding; Ink; Prosthdontics; Adhesive and Abrading Compositions; Molding, Shaping, Treating Process, and Apparatus Therefor; Irradiation (Part); Bleaching; Dyeing; Leather, Fur and Textile Treating Compositions.

COATING, LAMINATING AND PHOTOGRAPHY, GROUP 160—S. N. ZAHARNA, Director 3-09-82
Coating: Processes, Apparatus and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; and Photography.

SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—
R. F. WHITE, Director 1-12-82
Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.

ELECTRICAL EXAMINING GROUPS

INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—S. W. ENGLE, Director 5-22-81
Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Horology; Acoustics; Recorders; Weighing Scales.

SPECIAL LAWS ADMINISTRATION, GROUP 220—KENNETH L. CAGE, Director 3-30-81
Ordnance, Firearms and Ammunition; Lubrication; Illumination; Nuclear Reactors; Acoustics, Communications, Optics; Radar; Directional Radio; Torpedoes; Seismic Exploring; Cathode Ray Tube Circuitry; Cryptography; Laser Devices; Radioactive Materials; Powder Metallurgy, Rocket Fuels; Special, Fuel, Explosive and Thermic Compositions; Thermal and Photoelectric Batteries.

INFORMATION TRANSMISSION, STORAGE, AND RETRIEVAL, GROUP 230—EARL LEVY, Director 1-05-81
Communications; Multiplexing Techniques; Television; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.

RECEPTACLES, CLEANING, WINDING, AND MEASURING, GROUP 240—
G. M. FORLENZA, Director 5-12-81
Receptacles; Bearings; Joint Packing; Conduits; Switches; Presses; Plumbing Fixtures; Textile Spinning; Cleaning; Food Treating; Agitating; Centrifugal Separating; Geometrical Instruments; Sound Recording; Image Projectors; Web Feeding; Winding and Reeling; Cable Hoists; Measuring and Testing; Indicating; Fluent Material Handling; Shaft; Impellers; Rotary Fluid Motors.

ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—S. S. MATTHEWS, Director 8-25-80
Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.

DESIGN, GROUP 290—KENNETH L. CAGE, Director 1-30-81
Industrial Arts; Household, Personal and Fine Arts.

MECHANICAL EXAMINING GROUPS

HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director 5-18-81
Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.

MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—STEPHEN G. KUNIN, Director 7-27-81
Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion-Bonding, Metal Founding; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks; Fishing, Etc.; Butchering; and Books and Printed Matter.

AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—
R. E. AEGERTER, Director 8-27-82
Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Plants; Harvesting; Earth Working and Excavating; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Information Dissemination.

HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—D. J. STOCKING, Director 11-17-80
Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Couplings; Gearing; Fluid Handling and Control; Lubrication.

GENERAL CONSTRUCTIONS, TEXTILES, MINING AND GEARING, GROUP 350—
A. L. SMITH, Director 9-17-80
Building Structures; Racks; Cabinets; Closures; Supports; Furniture; Fasteners; Locks; Pipe Couplings; Joints; Miscellaneous Hardware; Textiles; Sewing Machines; Apparel; Footwear; Earth Engineering; Earth Drilling; Mining; Wells; Roads; Bridges; Tool Driving; Gearing; Machine Elements; Clutches.

Expiration of patents: The patents within the range of numbers indicated below expire during April 1983, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,243,822 to 3,248,737, inclusive
Plant Patents ..... Numbers 2,616 to 2,627 inclusive

REEXAMINATIONS

DECEMBER 20, 1983

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 Re. 28,474 (152nd)
PROCESS FOR RAPIDLY DISSOLVING WATER-SOLUBLE POLYMERS

Donald R. Anderson, Oswego, and Alvin J. Frisque, La Grange, both of Ill., assignors to Nalco Chemical Co., Oak Brook, Ill.

Reexamination Request No. 90/000,213, Jun. 3, 1982.
Reexamination Certificate for Reissue Patent Re. 28,474, issued Jul. 8, 1974, Ser. No. 413,831, Nov. 8, 1973.
Original No. 3,624,019, dated Nov. 30, 1971, Ser. No. 92,031, Dec. 15, 1970.
Int. Cl.³ C08J *3/06*
U.S. Cl. 523—336

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–15** is confirmed.

Claims **16** and **18** are determined to be patentable as amended:

Claims **17** and **19**, dependent on amended claims, are determined to be patentable.

New claims **20–30** are added and determined to be patentable.

1. A method of rapidly dissolving an acrylamide polymer into water, which comprises the steps of:

A. preparing a water-in-oil emulsion which contains dispersed therein between 5–75 percent by weight of finely-divided acrylamide polymer; said emulsion having an oil-to-water ratio between 5:1–1:10 and said oil being a hydrocarbon liquid; and then,

B. inverting said emulsion in water which contains a water-soluble surfactant whereby the acrylamide polymer is released into the water as a solution.

B1 4,216,767 (151st)
ENDOSCOPE WITH CLOSED PRESSURIZED INNER CAVITY

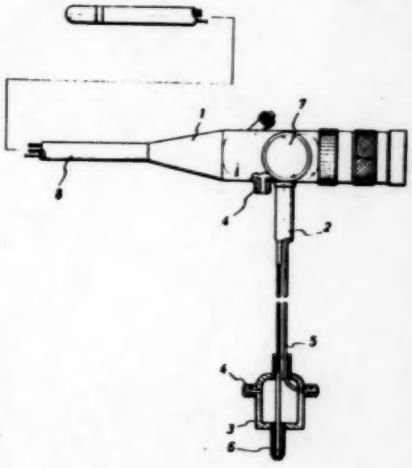
Hisatake Aoshiro, Tokyo, Japan, assignor to Machida Endoscope Co., Ltd., Tokyo, Japan

Reexamination Request No. 90/000,201, May 18, 1982.
Reexamination Certificate for Patent No. 4,216,767, issued Aug. 12, 1980, Ser. No. 877,899, Feb. 15, 1978.
Claims priority, application Japan, Feb. 21, 1977, 52-19060
Int. Cl.³ A61B *1/06*
U.S. Cl. 128—6

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–6** having been finally determined to be unpatentable, are cancelled.

[1. An endoscope comprising a grip end, an elongated sheath adapted to fit into a body orifice having a distal end and a proximal end, a fiber optic bundle extending from said proximal end to said distal end of said sheath, said grip end connected with said sheath and said sheath terminating in an examining end, said endoscope including said sheath having a closed inner cavity portion, the portions of said endoscope forming the walls of said closed cavity being non-expandable, said cavity extending along a major portion of said sheath, said sheath being flexible gas inlet means communicating with said



closed inner cavity portion of said endoscope, a source of pressurized gas connected to said gas inlet means to introduce pressurized gas into said closed inner cavity portion to be contained therein coupling means for enabling repeated connection between said source of pressurized gas and the gas inlet means for repeatedly pressurizing the inner cavity portion, wherein said pressurized gas prevents cleansing liquid on the outside of said endoscope from permeating said sheath and highlights pinholes in said sheath by the production of gas bubbles thereat.**]**

REISSUES

DECEMBER 20, 1983

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 31,464

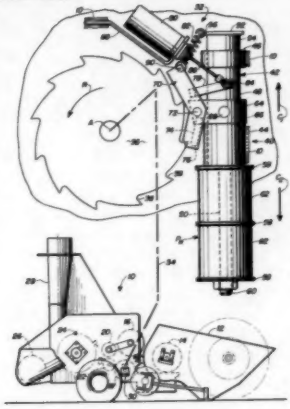
DAMPED APPARATUS FOR QUICK-STOPPING ROTATING MEMBERS

Wayne B. Martenas, New Holland; Edward H. Priepke, Stevens, and Robert A. Wagstaff, New Holland, all of Pa., assignors to Sperry Corporation, New Holland, Pa.

Original No. 4,296,591, dated Oct. 27, 1981, Ser. No. 192,783, Oct. 1, 1980. Application for reissue Sep. 30, 1982, Ser. No. 432,164

Int. Cl.³ A01D *75/18*

U.S. Cl. 56—10.3 **8 Claims**



1. A damped apparatus for quick-stopping a rotating member *which is connected to rotate with a feed roll of a crop harvesting machine, said damped apparatus* comprising:

a reaction member supported adjacent said rotating member, said reaction member including a slide and a slide support, said slide movable relative to said support;

a stop carried by said slide, said stop movable relative to said slide between a first position, free of engagement with said rotating member, and a second position in engagement with said rotating member;

means connected for damping movement of said slide in response to said stop being in said second position; and

means connected for moving said stop between said first and second positions.

Re. 31,465

COMPACTIBLE SHELTER

Vincent P. Robichaud, Westminster, Mass., assignor to Eric A. Robichaud, Westminster; Edward R. Robichaud and Denis J. Arsenault, both of Fitchburg, all of, Mass.

Original No. 3,995,649, dated Dec. 7, 1976, Ser. No. 580,874, May 27, 1975. Application for reissue Mar. 30, 1978, Ser. No. 891,950

Int. Cl.³ A45F *1/16*

U.S. Cl. 135—102 **6 Claims**

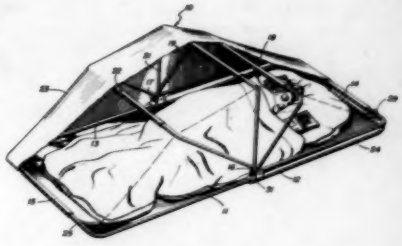
4. Compactible shelter, comprising:

(a) a rectangular frame having sides and ends,

(b) a hinge located at an intermediate portion of each of the sides,

(c) a plurality of U-shaped roof elements having their bights overlying the interior of the frame and the free ends of their legs pivotally attached to the hinges, and

(d) a flexible member formed of sheet material joining the frame and the roof elements, the rectangular frame consisting of two U-shaped members, the legs of one U-shaped member being received within the legs of the other U-shaped member, so that the frame can be reduced in size to a collapsed condition in which the bight of the said one U-shaped member lies adjacent the free ends of the said other U-shaped member, the flexible member being fixedly attached on one end to the



bight of one of the U-shaped members of the frame and at the other end to the bight on one of the U-shaped roof elements, this last-named roof element being adapted to lie against the other of the U-shaped members of the frame, thus providing a means of entering and leaving the assembled shelter, and means being provided to lock the two together when they lie face-to-face.

Re. 31,466

PROCESS FOR THE ADJUSTMENT OF THE GLASS TEMPERATURE IN A FLOAT GLASS LEHR AND FLOAT GLASS LEHR IN ORDER TO BRING THIS PROCESS INTO OPERATION

Jean P. Garcelon, Paris, France, assignor to Stein Surface, Ris Orangis, France

Original No. 4,303,437, dated Dec. 1, 1981, Ser. No. 150,238, May 15, 1980. Application for reissue Dec. 1, 1982, Ser. No. 445,935

Claims priority, application France, May 16, 1979, 79 13281

Int. Cl.³ C03B *25/04*

U.S. Cl. 65—99.3 **7 Claims**

1. In a method of operating a float glass lehr in which a float glass ribbon is passed on rollers through a lehr tunnel and is subjected to heating and cooling therein, and wherein arrays of tubes for heat exchange are provided above and below the glass ribbon, said tubes extending parallel to the direction of movement of the glass ribbon through the lehr, the improvement which comprises:

(a) forming each array in sets of mutually parallel transversely spaced coplanar tubes in successive zones along said path and grouping a plurality of tubes of each array for the respective zone in groups whereby for each array and each zone a respective plurality of such groups is disposed transversely of the direction of movement of the glass ribbon through the lehr;

(b) heating air separately for each of said groups and admitting the heated air to the tubes of each group at an [upstream] *downstream* end of the respective zone with respect to said direction of movement of the glass ribbon through each lehr;

(c) drawing heated air from the [downstream] *upstream* ends of the tubes of each zone; and

(d) measuring the temperature of the glass ribbon at the upstream end of each zone and selectively controlling the

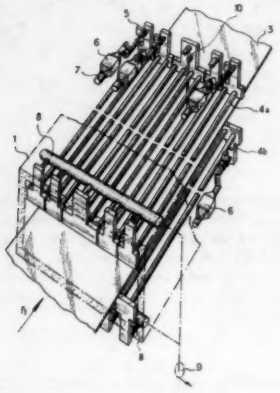
rates of flow through the respective groups of tubes in response to the measured temperature, thereby maintaining temperature homogeneity of the glass ribbon.

3. A float glass lehr for the heat treatment of a float glass ribbon, said lehr comprising:

an elongated lehr tunnel;

a multiplicity of rollers spaced apart longitudinally of said tunnel but extending transversely therein and forming a path along which said ribbon is displaced on said rollers;

a lower array of longitudinally extending, mutually parallel coplanar heat-exchanger tubes disposed below said path, and an upper array of mutually parallel coplanar transversely spaced heat-exhange tubes disposed above said path within said tunnel each of said arrays being subdivided longitudinally into respective zones, each zone having an upstream side and a downstream side with



respect to the direction of travel of said ribbon along said path;

means connecting a plurality of tubes of each array and each zone in a respective group whereby, for each zone, each of said arrays comprises a plurality of such groups in succession transversely of said direction;

a respective air heater communicating with the tubes of each group at an upstream end of the respective zone whereby heated air flows through said tubes in a direction opposite the direction of movement of said glass ribbon along said path;

means at the downstream end of each of said zones for drawing air from said tubes; and

means at the upstream end of each zone for measuring the temperature of the glass ribbon and controlling selectively the heating effect contributed by each group to said glass ribbon.

Re. 31,467

TRIARYL OR DIARYLPYRIDYL METHANES

Geraint Jones, and David S. Thomson, both of Macclesfield, England, assignors to Imperial Chemical Industries PLC, London, England

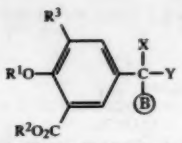
Original No. 4,152,341, dated May 1, 1979, Ser. No. 907,861, May 19, 1978. Division of Ser. No. 747,995, Dec. 6, 1976, Pat. No. 4,113,879. Application for reissue Mar. 4, 1980, Ser. No. 127,135

Claims priority, application United Kingdom, Dec. 29, 1975, 52999/75

Int. Cl.³ C07C *65/12*; C07D *211/30*

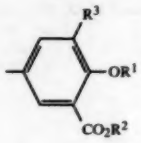
U.S. Cl. 260—395 **4 Claims**

1. A compound of the formula:



I

wherein [either] X is hydrogen and Y is a radical of the formula:



II

wherein R^1 is hydrogen or an acetyl radical; R^2 is hydrogen or a phenyl radical optionally substituted by a halogen atom; R^3 is hydrogen, a C_{1-6}alkyl radical or a halogen atom; B is a 4-pyridyl radical, or a phenyl radical which may optionally bear from 1 to 3 substituents selected from halogen atoms, nitro, cyano, carbamoyl, carboxy, formyl and N-hydroxyazomethylidene (HO—N=CH—) radicals; or a pharmaceutically acceptable salt of a compound of formula I wherein R^2 is hydrogen; but excluding those compounds of formula I as defined above wherein R^1 and R^2 are hydrogen, R^3 is a methyl radical, and B is a phenyl, 2-chlorophenyl, 4-chlorophenyl, *2-nitrophenyl, 4-nitrophenyl,* 2,6-dichlorophenyl, 2,5-dichlorophenyl or a 2,3,6-trichlorophenyl radical; or wherein R^1, R^2 and R^3 are hydrogen and B is a 2,4dinitrophenyl radical.

Re. 31,468

LIQUID REACTIVE POLYMERS

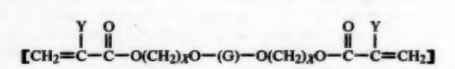
Chin C. Hsu, Avon Lake, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

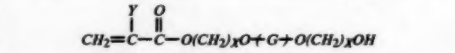
Original No. 4,256,910, dated Mar. 17, 1981, Ser. No. 73,161, Sep. 6, 1979. Application for reissue Mar. 15, 1983, Ser. No. 475,433

Int. Cl.³ C08G *65/24*

U.S. Cl. 560—209 **19 Claims**

1. A terminally unsaturated liquid epihalohydrin polymer having the formula





wherein Y is hydrogen or methyl, X is 2 to 10 and G is a polymeric backbone obtained by homopolymerizing an epihalohydrin, copolymerizing two or more epihalohydrins, or copolymerizing an epihalohydrin with a vicinal epoxide.

Re. 31,469

REACTIVE LIQUID POLYMERS

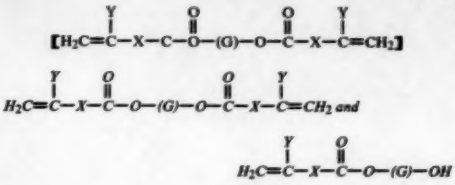
Changkiu K. Riew, Akron, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Original No. 4,256,904, dated Mar. 17, 1981, Ser. No. 73,160, Sep. 6, 1979. Application for reissue Mar. 15, 1983, Ser. No. 475,435

Int. Cl.³ C08G *65/24*

U.S. Cl. 560—209 **18 Claims**

1. A terminally unsaturated liquid epihalohydrin polymer having the formula



wherein Y is hydrogen or methyl, [x] *X* is zero, alkylene or arylene and G is a polymeric backbone obtained by homopolymerizing an epihalohydrin or copolymerizing at least one epihalohydrin with at least one other 1,2-epoxide.

Re. 31,470

STRIPLINE FILTER DEVICE

Brian E. Bedard, Tamarac, and Bertho K. Boman, Fort Lauderdale, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Original No. 4,266,206, dated May 5, 1981, Ser. No. 938,564, Aug. 31, 1978. Application for reissue May 6, 1982, Ser. No. 375,433

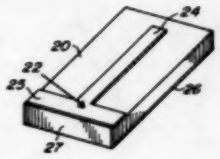
Int. Cl.³ H01P *2/03, 7/08*

U.S. Cl. 333—204 **24 Claims**

1. An improved transmission line resonator device, adapted for use in a predetermined frequency band, wherein the effects of mask misalignment during manufacture are minimized, including in combination,

a dielectric substrate having a conducting layer formed on one side thereof as a ground plane,

a thin film conductor structure formed on said substrate on the side thereof opposite to said ground plane layer which



includes at least one elongated relative narrow resonator portion having a length related to the predetermined frequency but less than the length of said dielectric substrate, and a relatively wide grounding portion connected to said resonator portion at one end thereof, and

electrical means connecting said grounding portion to said ground plane conducting layer.

PLANT PATENTS

GRANTED DECEMBER 20, 1983

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

5,159
CHERRY ROOTSTOCK—COB VARIETY

Henry M. Tydeman, deceased, late of Maidstone, England (by Elizabeth M. Tydeman, executor), and by William M. Tydeman, executor, Bangor, Wales, assignors to National Seed Development Organisation Limited, Newton, England

Filed Aug. 16, 1982, Ser. No. 408,596
Int. Cl.³ A01H *5/03*
U.S. Cl. Plt.—37 **1 Claim**

1. A new and distinct variety of cherry tree useful as an improved rootstock for ornamental flowering cherry cultivars, substantially as illustrated and described, which when used as such rootstock facilitates more vigorous growth, enhanced blossom formation, and thicker trunk growth during the first six years.

5,160
KALANCHOE PLANT NAMED CINNABAR

James C. Mikkelsen, Ashtabula, Ohio, assignor to Mikkelsens, Inc., Ashtabula, Ohio

Filed Sep. 15, 1982, Ser. No. 418,488
Int. Cl.³ A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of kalanchoe plant known by the cultivar name Cinnabar, as described and illustrated, and particularly characterized by deep orange-red florets; floriferous flowering habit; strong, vigorous stems and vigorous growth habit with close internodes; medium size, nearly round foliage, and excellent self-branching.

5,161
BEGONIA PLANT NAMED LYRIC

James C. Mikkelsen, Ashtabula, Ohio, assignor to Mikkelsens, Inc., Ashtabula, Ohio

Filed Sep. 15, 1982, Ser. No. 418,490
Int. Cl.³ A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of begonia named Lyric, as described and illustrated, and particularly characterized by its double white flowers with ruffled edges; dark green, firm to crisp glabrous foliage with serrated edges; excellent keeping qualities, and continuous year round flowering.

5,162
BEGONIA PLANT NAMED DORTHE

Erland V. Schelbeck, Odense, Denmark, assignor to L. Duehnfeldt Ltd., Odense, Denmark

Filed Sep. 20, 1982, Ser. No. 420,521
Int. Cl.³ A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of begonia named Dorthe, as described and illustrated, and particularly characterized by its compact and upright growth habit; year round flowering; large deep red double flowers; medium and firm waxy foliage, and by its outstanding keeping qualities.

5,163
CHRYSANTHEMUM PLANT

William E. Duffett, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed Jan. 27, 1982, Ser. No. 343,259
Int. Cl.³ A01H *5/00*
U.S. Cl. Plt.—76 **1 Claim**

1. A new and distinct cultivar of *Chrysanthemum morifolium,* Ramat., plant known by the cultivar name of Sequoia, as described and illustrated, and particularly characterized as to uniqueness by the combined characteristics of flat capitulum form; decorative capitulum type; red bronze ray floret color; diameter across face of capitulum ranging from 100 to 125 mm. at maturity; uniform 10 week flowering response; medium plant height; spreading branching pattern, and by its photosynthetic efficiency, producing strong plants under low winter light regimes with 14 to 16 hour continuous dark periods.

PATENTS

GRANTED DEC. 20, 1983

ERRATA

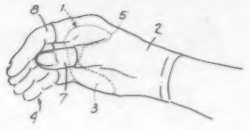
For CLASS	See PATENT NO.
374–043	4,420,965
383–061	4,421,150
266–143	4,421,263
502–055	4,421,672
502–167	4,421,673
502–154	4,421,674
502–150	4,421,675
502–185	4,421,676
549–360	4,421,689
424–248	4,421,927
381–098	4,421,949

PATENTS

GRANTED DECEMBER 20, 1983

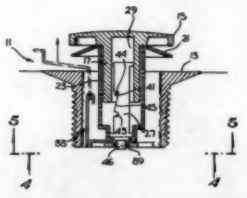
GENERAL AND MECHANICAL

4,420,843
CYCLISTS' GLOVES
Claude Genzling, 7, rue Serevo, Paris, France (75014), and Michel Mathieu, 4, Allee du Chatellier, Lussault, France 37400
Filed Apr. 13, 1982, Ser. No. 367,893
Claims priority, application France, Apr. 16, 1981, 81 07682
Int. Cl.³ A41D *19/00*
U.S. Cl. 2—161 A **4 Claims**



1. Improvement to cyclists' gloves, wherein a lining member is provided inside the glove, which lining member is placed between the cyclist's hand and the wall of the glove, the said lining member having a part which adopts the outline of the palm of the hand and a collar-shaped part provided with an opening on one side, defining the space between the thumb and the index, when the hand is half-closed.

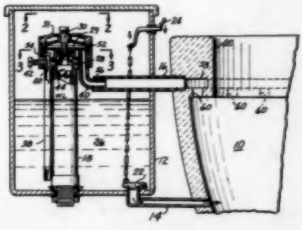
4,420,844
VANDAL RESISTANT DRAIN STOPPER
William E. Puckett, Kirkland, Wash.; Wanda F. Baird, and Richard C. Chappell, both of Downey, Calif., assignors to Rapid Fit Enterprises, Inc., Bell Gardens, Calif.
Filed Nov. 18, 1982, Ser. No. 442,644
Int. Cl.³ A47K *1/14*
U.S. Cl. 4—295 **18 Claims**



1. In a drain valve for selectively sealing a conduit, said drain valve having a drain housing with a first sealing surface, latching means removably coupled to said drain housing for releasably latching and holding a second sealing surface in sealing relationship with said first sealing surface, whereby fluid is prevented from flowing through said drain valve into said conduit when said sealing surfaces are in said sealing relationship, and actuator means coupled to said latching means, for transmitting force to latch and unlatch said latching means, the improvement comprising:

locking means for preventing said latching means from being disengaged from said housing, wherein said locking means is comprised of a locking member coupled to said latching means, said locking member having means for receiving a tool adapted for insertion into said drain valve, through an end thereof adjacent said first and second sealing surfaces, for releasing said locking member, thereby allowing the disengagement of said latching means from said drain housing.

4,420,845
FLOAT VALVE ASSEMBLY WITH FLOW CONTROL AND VOLUME BALANCING MEANS
Bruce A. Antunez, 2153 Iron Club Dr., La Verne, Calif. 91750
Filed Mar. 2, 1982, Ser. No. 353,819
Int. Cl.³ F16K *31/26, 47/08*
U.S. Cl. 4—366 **14 Claims**



1. A valving system for a toilet installation that includes a storage tank, a toilet bowl, and a conduit with a flush valve discharging from the tank to the bowl, said toilet bowl having a wall to be washed, and a rim above said walls, said system comprising: a water level-responsive valve adapted to be mounted in said tank, said valve having an inlet and an outlet; a supply line connected to the inlet of said valve to supply water to it under pressure; a tank refill line for discharging from said valve into said tank; a bowl wash line for discharging to said rim, said tank refill line and bowl wash line being directly connected to the outlet of said valve so that both always simultaneously receive water from said level responsive valve whenever said valve is open to flow; and adjustable flow proportioning means in at least one of said tank refill line and said bowl wash line to proportion to flow between them, said flow proportioning means being disposed at a location such that both lines always simultaneously receive water under pressure when said valve is open to flow and regardless to the rate of flow of the water from said valve, and said storage tank will be refilled at a rate which assures simultaneous flushing of the bowl, rinsing of the bowl, and the making of a gas seal, all before the storage tank is refilled to a level where the level responsive valve shuts off.

4,420,846
SPA SYSTEM
Jack D. Bonner, 3938 Deer Haven Ct., Las Vegas, Nev. 91820
Continuation-in-part of Ser. No. 226,528, Jan. 19, 1981, abandoned. This application Jan. 19, 1982, Ser. No. 340,815
Int. Cl.³ A47C *19/12*; A61H *9/00*
U.S. Cl. 4—542 **15 Claims**

1. In a recirculating spa system wherein water is drawn from a tub containing water and pumped back into the tub by a pump through jets to cause an entering air/water mixture, the improvement comprising:

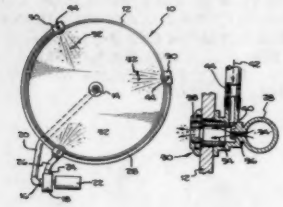
(a) water manifold means located generally adjacent said pump on one side only of said tub for receiving water exiting the pump and maintaining a supply of such water within a water chamber thereof at substantially equal water pressures throughout said chamber, said manifold

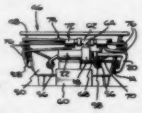
means having a plurality of water exit openings equal in number to the number of jets being used in the tub and being positioned relative said chamber to receive equal water pressure; and

(b) individual water connecting conduits connecting the jets to respective ones of said water exit openings.

2. In a recirculating spa system wherein water is drawn from a tub containing water and pumped back into the tub by a pump through jets to cause an entering air/water mixture, the improvement comprising:

a water manifold having a water receiving chamber disposed to receive water exiting the pump, said manifold having a plurality of water exit openings equal in number to the





number of jets being used in the tub and being positioned relative said water receiving chamber to receive equal water pressure; and,

individual water connecting conduits connecting the jets to respective ones of said water exit openings, wherein:

(a) the jets are venturi jets wherein each jet has an air inlet through which air is drawn as a result of the water passing through the jet; and additionally comprising,

(b) an air manifold having an air inlet to an air chamber and a plurality of air exit openings from said air chamber; and,

(c) individual air connecting conduits connecting the air inlets of the jets to respective ones of said air exit openings.

4,420,847

HEAD WARMING PILLOW CASE

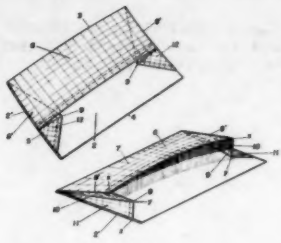
Jean E. Smith, 3305 Longbow Dr., Pittsburgh, Pa. 15235

Filed Dec. 8, 1980, Ser. No. 214,411

Int. Cl.³ A47G 9/02

U.S. Cl. 5—490 **6 Claims**

1. A pillow case comprising two overlying rectangular panels joined together along both the two long edges and across one end only with their other edges unattached and free of each other thus forming an envelope-like cover to receive a pillow through the open end, a trapezoidal strip more than half as wide but less than the full width of the panels from one long edge to the other, the trapezoid having a rectangular central area with parallel lengthwise edges and end edges of equal length diverting from the shorter edge of the trapezoid to the longer whereby there are opposite equal right angle triangular end areas, one at each end of the rectangular central area of the strip, the shorter of the parallel edges of the trapezoid being stitched along one long edge of the pillowreceiving envelope, one diagonal end edge of said trapezoidal strip being stitched along the closed end of the envelope and the other diagonal edge of the strip being stitched to the other edge of the underlying rectangular panel, the long edge of the rectangular central area of the trapezoidal strip being loose and unattached to



the envelope-like cover, the triangular end areas of each end of the trapezoidal strip being folded into a reversely folded pleat under the central area of the overlying rectangular area of the trapezoidal strip, with the end edges of the rectangular area of said strip being even with corresponding ends of the envelope-like cover.

4,420,848

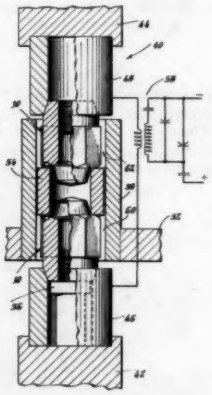
METHOD AND APPARATUS FOR MANUFACTURING WELDED CAPPED WHEEL NUTS

Philip D. Becker, Southbury, Conn., assignor to Buell Industries, Inc., Waterbury, Conn.

Filed Apr. 15, 1982, Ser. No. 368,764

Int. Cl.³ B21D 53/24

U.S. Cl. 10—72 R **12 Claims**



1. The method of welding a cap to a nut body to form a welded capped nut comprising the steps of taking a pair of nuts each having a nut body with a bottom engaging end, a top end opposite said bottom end, a threaded opening between the two ends for receiving a securing stud, a plurality of wrench flats extending between said top end and said bottom end, a sheath-like cap covering said top end and said wrench flats, said cap being capable of contacting said top end of said nut body, positioning said pair of capped nuts in linear spaced-apart alignment with their top ends opposed to one another, positioning an open ring-like connector of electrically conductive material between said aligned capped nuts and in contact with said tops thereof, surrounding said aligned capped nuts with an

open sleeve of electrically nonconductive material, the ends of said sleeve extending to at least a portion of the respective nut bodies leaving said bottom ends thereof exposed, bringing one each of a pair of welding electrodes into contact with each respective exposed bottom end, applying sufficient pressure to said electrodes to cause said ring-like connector to urge said caps of each nut into contact with said top ends of said nut body and to form a welding electrical circuit, and applying a current between said electrodes sufficient to weld each of said caps to their respective nut bodies at a location of contact between said caps and said top end of said nut body.

4,420,849

RAMP BRIDGING DEVICE

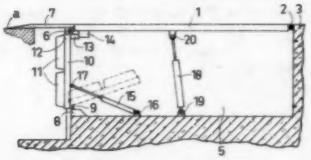
Kurt Alten, Ringstr. 14, D-3015 Wennigsen, Fed. Rep. of Germany

Filed Apr. 16, 1981, Ser. No. 254,615

Claims priority, application Fed. Rep. of Germany, Apr. 24, 1980, 3015717

Int. Cl.³ E01D *1/00*

U.S. Cl. 14—71.3 **4 Claims**



1. A ramp bridging device, the ramp having therewith means forming a recess delimited by a rear surface and a base surface, said device comprising in combination:

a bridge plate having a rear end and a forward end, said rear end of said bridge plate being pivotally mounted on said rear surface of said ramp so as to be pivotable about a horizontal axis;

an extension portion mounted on said forward end of said bridge plate, said extension portion being extensible and retractable with respect to said bridge plate and being locatable, in said extended state, on a platform to be loaded on unloaded; and

stop buffers pivotably mounted on said base surface of said recess and extending laterally of said extension portion of said bridge plate, said stop buffers being pivotable between a first operative position wherein said stop buffers extend substantially vertically, and a second inoperative position wherein said stop buffers are located in said recess below said bridge plate, whereby in said first operative position, said stop buffers protrude forwardly of said forward end of said bridge plate, said stop buffers respectively including an upper free end, said bridge plate being provided with an abutment for the free ends of said stop buffers during bracing engagement thereagainst, when said stop buffers are located in said first operative position, to prevent movement of said stop buffers to said second inoperative position, said bridge plate including a bottom surface, an abutment member being provided on, and directed away from, said bottom surface, to engage the stop buffers accordingly directly as to the free end though also slightly below the upper free end thereof, said abutment member effecting the bracing engagement of said stop buffers when said stop buffers are located in said first operative position.

4,420,850

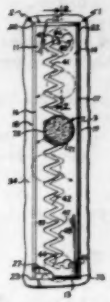
BACK WASHING DEVICE

Larry E. Moore, Box 96, Osage Beach, Mo. 65065

Filed Jan. 18, 1982, Ser. No. 340,313

Int. Cl.³ A61H *33/00*

U.S. Cl. 15—21 R **16 Claims**



1. A device for back washing and the like, which comprises:

(a) a guide assembly having a panel with a slot extending therethrough, said slot comprising a plurality of interconnected, alternating slanted runs;

(b) a traveler assembly mounted on said guide assembly and movable along said runs, said traveler assembly including:

(1) a mounting block;

(2) a guide pin extending from said mounting block and through said slot;

(3) a retainer attached to said guide pin whereby said panel is positioned between said mounting block and said retainer with said guide pin in said slot; and

(4) washing means mounted on said mounting block and engageable by a person.

4,420,851

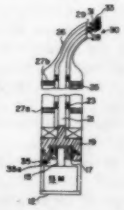
MECHANIZED TOOTH BRUSH HAVING MOVEMENT IN TWO PLANES

Stanley M. Wiener, 1857 Floyd St., Sarasota, Fla. 33579

Filed Dec. 7, 1981, Ser. No. 328,373

Int. Cl.³ A46B *13/02*

U.S. Cl. 15—22 R **1 Claim**



1. A mechanical tooth brush having rotary and longitudinal motion comprising:

an elongated cylindrical housing;

said housing contains a motor located at a first end of said housing;

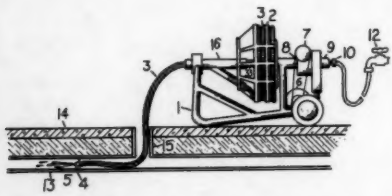
said housing contains an orifice at a second end opposite to said first end at which said motor is located within said housing;

an output shaft is connected to said motor;

an inner magnet is connected to said output shaft; said inner magnet is perpendicular to said output shaft;

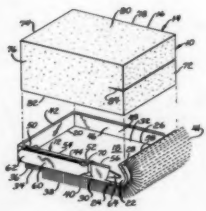
a flexible shaft extends through the interior of said housing and passes outside said housing through said orifice;
a guide tube guides said flexible shaft through said interior of said housing until reaching said orifice;
said flexible shaft adapted for slidable longitudinal motion within said guide tube;
said flexible shaft exits said housing and is connected to an output coupling at a first end of said flexible shaft outside of said interior of said housing;
a cup-shaped magnet is connected to a second end of said flexible shaft within housing, opposite to said first end of said flexible shaft;
said cup-shaped magnet forms a first edge shaped in a circular, sinusoidal wave;
a bearing rotatable on a bearing shaft;
said first edge of said cup-shaped magnet bears continuously on said bearing, to provide said flexible shaft with longitudinal motion as said flexible shaft rotates; and
said cup-shaped magnet is disposed over and around said inner magnet.

4,420,852
DRAIN CLEANING MACHINES
David Bowlsby, 533 W. State St., Ithaca, N.Y. 14850
Filed May 8, 1981, Ser. No. 262,202
Int. Cl.³ B08B 9/02
U.S. Cl. 15—104.3 SN **2 Claims**



1. In a drain cleaning machine of the type having a removable powered rotatable drum for storing a length of coiled spring snake for insertion into the drain to be cleaned; said drum mounted upon, and cooperating with, a powered rotatable shaft having two portions, one adapted to supporting and engaging the drum, the other adapted to receiving the rotary power; power means for imparting rotating power to the shaft; said coiled spring snake being attached at one end to the drum such that a rotary motion is imparted to the other, free, end of the snake, which is inserted into the drain to be cleaned; means for supporting the shaft and the drum in cooperation with each other; wherein the improvement comprises providing a stream of water to the free end of the snake by means of a modification to the machine comprising:
(a) said powered rotatable shaft having a gallery extending from the end of the shaft adapted to receiving the rotary power to a point in the outside of the shaft in the drum supporting portion;
(b) swivel coupling means for attaching a water-supply hose from a source of house pressure water to the rotatable shaft such that water from said source of house pressure water passes from said hose into the gallery through the power receiving end;
(c) flange means for engaging the drum mounted upon the drum-supporting portion of the rotatable shaft;
(d) hub means for supporting the frame of the drum upon the drum-supporting portion of the rotatable shaft, having means for attaching a hose on the outside surface of the hub, said means for attaching a hose communicating with the interior of the hub means, for feeding water from the interior of the hub means into a tube attached to the hose attaching means;
(e) seal means for preventing leakage between the hub means and the flange means;
(f) clamp means for holding the hub means firmly against the flange means of the rotatable shaft, such that they compress around the seal means without leakage of water;
(g) flexible tube means for carrying water, inserted inside the coiled spring snake, having an inside diameter of at least 5/16″ and a length at least equal to the length of the coiled spring snake;
(h) cable end means rigidly attached to the free end of the coiled spring snake;
(i) nozzle means for directing water flow, mounted upon the cable end means, and aligned along the longitudinal axis of the cable end, such that water passing through the nozzle means is directed down the pipe to be cleaned;
(j) said tube means being connected at one end to the hose attaching means of the hub means, and at the other end to the nozzle means mounted upon the cable end means of the coiled spring snake;
(k) the cable end means at the free end of the coiled spring snake attaching to the tube means through a swivel coupling means for allowing differential twisting between the snake and the tube.

4,420,853
SCRUB BRUSH
Thomas Gilman, Woodstock, Ill., and Frank N. Miller, Racine, Wis., assignors to The Kendall Company, Boston, Mass.
Filed Nov. 25, 1981, Ser. No. 324,748
Int. Cl.³ A46B 9/00
U.S. Cl. 15—111 **6 Claims**

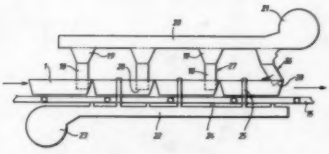


1. A scrub brush comprising, a housing having a base, a back side, a front side, a pair of opposed sides extending between the back side and front side, and a forward portion extending from the base on the front side at an acute angle relative to the base, said base having a plurality of bristles extending from a lower surface of the base, and said forward portion having a plurality of bristles extending outwardly from the forward portion, including a handle member positioned on an upper surface of the base, wherein the housing includes an upstanding back wall on the back side, and a pair of opposed upstanding sidewalls on the opposed sides and connected to the back wall, said walls defining a cavity to receive said handle member, and wherein the handle member comprises a block of foam received in the cavity.

4,420,854
APPARATUS FOR CLEANING TRAYS
John Newton, 126 Church Rd., Hartshead, Liversedge, West Yorkshire, England
Filed Jun. 23, 1981, Ser. No. 276,652
Claims priority, application United Kingdom, Jun. 28, 1980, 8021295; Aug. 12, 1980, 8026244; Jan. 15, 1981, 8101237
Int. Cl.³ B08B 9/08
U.S. Cl. 15—302 **13 Claims**

13. Apparatus for washing and drying trays having upstanding side walls and comprising washing means comprising a tank for containing a washing fluid, means defining a path of

travel for the trays through the tank in relationship to the intended liquid level within the tank such that the bases of the trays are immersed in liquid to a shallow depth as the trays move through the tank, and a series of rotatable brushes arranged along the path of travel through the tank and mounted for rotation about horizontal axis extending transversely to said path of travel through the tank and above the maximum height of the side walls, each said brush comprising a floppy brush extending transversely to said path of travel through the tank and having floppy filaments extending radially from said axis, said filaments serving to brush-wash the tray surfaces, upon rotation of the brush, by agitation of the washing fluid in contact therewith, and simultaneously to propel the trays along said path through said tank, and said filaments being sufficiently floppy to yield upon engagement with the tray walls so as not to impede the brush-washing and propelling action imparted to the trays by the brush, said apparatus further comprising means defining a further path of travel for the trays, means for passing the trays along said further path of



travel and drying means disposed along the further path of travel for the trays for directing jets air onto the tray surfaces to dry the latter, said drying means comprising a plurality of depending air nozzles arranged along said further path of travel and each having and outlet at the lower endthereof for directing the jet of drying air toward the surfaces of the trays as the trays move along said further path of travel for the trays, and mounting means for mounting each air nozzle in relationship to the further path of travel for the trays so as to be displaceable between a drying position in which the respective outlet is located inside of a tray close to the base of the tray and below the upper edge of the side wall of the tray, in below the upper edge of the side wall of the tray, in a displaced position in which the nozzle does not impede the travel of the tray along said path, and such that each nozzle is displaceable from its drying position by engagement therewith of the side wall of one of the trays as that tray moves along said further path of travel for trays, and is thereafter returnable automatically to the drying position when no longer engaged by the side wall of the tray.

4,420,855

SET OF ELECTRODES FOR AN APPARATUS FOR ELECTRICALLY STUNNING SLAUGHTER CATTLE

Gerrit J. Nijhuis, Winterswijk, Netherlands, assignor to Machinefabriek G.J. Nijhuis B.V., Winterswijk, Netherlands

Filed Jul. 21, 1981, Ser. No. 285,579

Claims priority, application Netherlands, Jul. 25, 1980, 8004289

Int. Cl.³ A22B *3/06*

U.S. Cl. 17—1 E **4 Claims**

1. Electrodes for stunning an animal without leaving trace on the animal hide, comprising:

a first electrode and a second electrode, the second electrode being generally shaped in a mirror image of the first electrode, said electrodes being located between the operating surfaces of two endless conveyors defining a V-shaped passage and running synchronously and in parallel relationship to each other, said electrodes being arranged side by side pivotably around a horizontal transverse axis lying above the conveyors and each comprising a plate the outer edges of which extend substantially parallel to and in close relationship along the operating surfaces of the conveyors and of which the edges facing to each other diverge in upward directions from the under ends and through a curvature merge into edges converging to each other, said electrodes viewed in the direction of conveyance being directed slantingly downwards and frontwards from above with the inner edges directed further frontwards from beneath with respect to the outer edges and subsequently run back again such that in the center portion viewed in the direction of advance a V-shaped position of the operating surfaces of the electrodes is obtained, the under edges of the electrodes being rounded off, which rounding-off leads smoothly to the outer edges on the diverging portion and on said curvature and said diverging portion merges smoothly into the converging edge portion having a reverse bending upwards.

4,420,856

APPARATUS FOR PROCESSING STUFFED SAUSAGE CASING

Francis J. Ziolko, Bridgewater, N.J., assignor to Devro, Inc., Somerville, N.J.

Division of Ser. No. 279,895, Jul. 2, 1981. This application Jun. 1, 1983, Ser. No. 500,204

Int. Cl.³ A22C *11/00*

U.S. Cl. 17—34 **5 Claims**

1. Apparatus for forming individual sausage links from stuffed casing comprising a plurality of pairs of forming arms attached to a mounting means which is capable of moving in an endless cycle, said pairs of forming arms being capable of opening and closing at predetermined points in the cycle, each of the forming arms in a pair of forming arms having an inner surface which faces the inner surface of the other forming arm in the same pair of forming arms and an outer surface which is opposite the inner surface, each of such forming arms having at the end of said arm an opening which faces the opening in the other forming arm in the same pair, a stabilizer affixed to at least one forming arm in each pair of forming arms, a portion of the stabilizer extending beyond the outer surface of the other forming arm in the same pair if forming arms, so that the stabilizer will not contact the opposing forming arm when the forming arms are brought into a closed position, the stabilizer being positioned to contact the stuffed casing and guide the casing into the closed end of the opening in said forming arms.

4,420,857

BAG FASTENER

Bobby L. Clay, Rohnert Park, Calif., assignor to Cevco, Inc., Rohnert Park, Calif.

Continuation of Ser. No. 118,477, Feb. 2, 1980, abandoned. This application Aug. 3, 1981, Ser. No. 289,207

Int. Cl.³ B65D *63/00, 30/00*

U.S. Cl. 24—16 PB **7 Claims**

1. A fastener capable of being assembled, with a flexible

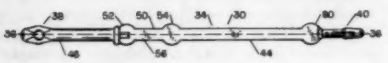
article having a plurality of annular orifices, the orifices being of a predetermined diameter, comprising:

an elongated body defining a longitudinal axis with a one and an other spaced apart ends and being formed of a resiliently deformable material;

a flexible strap of said body longitudinally extending a predetermined first distance from said other end toward said one end;

a shank of said body longitudinally extending a predetermined second distance from said one end toward said other end, said shank being rigid relative said strap;

a medial portion of said body interconnecting said shank and said strap and of a construction sufficient to be fitted and held in one of the orifices of the flexible article; and



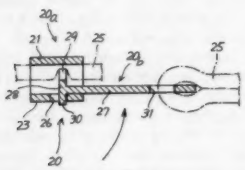
reusable means for snappingly connecting said ends of said body together and for easily releasing a connection of said ends, said reusable means including a bore passing through said shank adjacent said one end of said body and a peniform member at said other end of said body, said peniform member having a blunt leading tip, a cylindrical shaft, and an annular surface between and continguous with said leading tip and said shaft, said annular surface radially outwardly projecting from said shaft to said leading tip and inclined therebetween toward said leading tip, said ends of said body being easily released by application of a manual force imposed upon said blunt leading tip of said peniform member.

4,420,858

DEVICE FOR ADJUSTING THE LENGTH OF A BAND OR THE LIKE

Taizo Noda, Hyogo, Japan, assignor to Kohshoh Limited, Kyoto, Japan

Filed Jan. 9, 1981, Ser. No. 223,767
Claims priority, application Japan, Jan. 14, 1980, 55-2794
Int. Cl.³ A44B *11/06*
U.S. Cl. 24—170 **12 Claims**



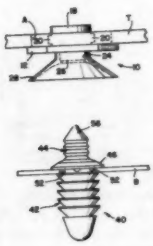
1. A device for adjusting the length of a strip of material such as a band, a belt, a shoulder strap or the like; comprising a first component member and a second component member detachably connected to said first component member; said first component member comprising a passage for said strip to be inserted through and bearing means, an annular body made of a top wall, a pair of opposite side walls and a bottom wall and so shaped as to define said passage, and said second component member comprising a plate member, one end portion of which is bent substantially perpendicularly to the remainder of said plate member, said second component member having a portion disposed inside said passage of said first component member when said second component member is connected to said first component member, said portion of said second component member comprising first means cooperating with said bearing means of said first component member thereby to connect said first and second component members so that said second component member can be moved between a first and a second position relative to said first component member, and second means for engaging a portion of said strip to securely fasten the same when said second component member is in one of said first and second positions, said second component member further comprising a tongue provided on said plate member adjacent to said bent portion and extending in a direction substantially opposite to said bent end portion, and a slot formed in the opposite end portion of said plate member for attaching one end of said strip to said second component member.

4,420,859

TWO-PART PANEL FASTENER

Frederick A. Hammerle, Topsfield, Mass., assignor to TRW Inc., Cleveland, Ohio

Filed Oct. 5, 1981, Ser. No. 308,225
Int. Cl.³ A44B *21/00*
U.S. Cl. 24—585 **17 Claims**



1. A two-part fastener for attaching two apertured panels together, comprising a socket member and a stud member, said socket member comprising a base, a retainer extending from one side of said base, said retainer including an elongated head supported above said base and which is adapted to pass through an elongated aperture in a first one of the panels in that said head and the aperture are relatively dimensioned to permit the head to pass through the aperture from one surface of the panel when the head is oriented so that it lies generally parallel to the longer dimension of the aperture, and to retain said socket member relative to the first panel when said head is turned a quarter turn from said orientation so that it overlaps the opposite surface of the panel, a receptacle extending from a side of said base opposite said retainer and defining a bore and an opening to the bore, and a flange extending from said receptacle and having a concave surface facing away from said base and surrounding the opening to the bore, said stud member comprising a lower shank adapted to pass through an aperture in a second one of the panels and to retain said stud member relative to the second panel, a collar for limiting the travel of said lower shank through the aperture in the second panel, and an upper shank adapted to pass through the opening into the bore of said receptacle of said socket member and to retain said stud member relative to said socket member.

4,420,860

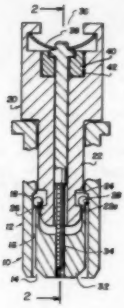
QUICK DISCONNECT PIN ASSEMBLY

Steve R. Chamuel, West Peabody, Mass., assignor to The United States of America as represented by the Secretary of the Army, Alexandria, Va.

Filed May 17, 1982, Ser. No. 379,225
Int. Cl.³ A44B *17/00*
U.S. Cl. 24—613 **6 Claims**

1. A quick disconnect pin assembly of type permitting insertion of a pin into a receiving bushing, comprising a receiving bushing having an internal bore adapted to receive a disconnect pin, a portion of the bore away from its receiving end being enlarged, or recessed, to form a shoulder between its smaller bore section and its larger bore section, a disconnect

pin insertable in the bore and having a side face portion and an end face portion with an annular groove there between, the groove being in alignment with the recess when the pin is in an inserted position in the bushing, the groove defining a locking ring seat, the end face portion of the disconnect pin having a diameter less than that of the side face portion to provide a release means space, a resilient locking ring disposed in the groove between said pin and said bushing, being of a size and resilience that it is pushed aside into said groove on insertion of



said pin into said bushing but locks between said seat and said shoulder to prevent withdrawal of said pin after said pin is inserted into said bushing, and a release means for releasing said ring from engagement between said seat and said shoulder to permit removal of said pin from said bushing, the release means including a release member, movably mounted on said disconnect pin and having a skirt portion in said release means space engageable with said locking ring to dislodge the locking ring from its locked position.

4,420,861

WARP BEAM LOADING AND UNLOADING APPARATUS FOR A WARPING MACHINE

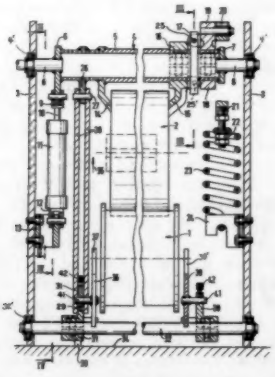
Wilhelm Kofler, Uzwil, Switzerland, assignor to Maschinenfabrik Benninger AG, Uzwil, Switzerland

Filed Aug. 26, 1980, Ser. No. 181,489

Claims priority, application Switzerland, Sep. 13, 1979, 8279/79

Int. Cl.³ D02H *3/00*

U.S. Cl. 28—196 **3 Claims**



1. An apparatus for use with a beam warping machine equipped with means enabling the clamping and unclamping of a warp beam at the beam warping machine and serving for lifting-in and lifting-out the warp beam and for advancing and uniformly pressing a press roll against the warp beam during operation of the beam warping machine as well as for lifting-off the press roll from the warp beam, comprising:

a first shaft defining an axis of rotation;

lifting fork members pivotably mounted for pivotable movement at said first shaft about said axis of rotation;

said lifting fork members serving for lifting-in and lifting-out a warp beam;

a second shaft;

a pair of press roll arms radially protruding from said second shaft and rigidly connected for rotation with said second shaft;

a press roll mounted between said pair of press roll arms;

said pair of press roll arms serving for advancing the press roll towards the warp beam and for lifting-off the press roll from said warp beam;

a single cylinder unit operatively connected with said second shaft for pivoting the lifting fork members and the press roll arms;

a lever rigidly connected for rotation with said second shaft;

hinge means operatively connecting said lever with said lifting fork members;

said lifting fork members being actuated by said lever through the action of said hinge means such that a rotation of said second shaft through a first angular range only pivots the press roll and only after pivoting said second shaft thereafter through a second angular range is there pivoted said lifting fork members;

said hinge means includes a pair of bracket members extending in the same direction of extent;

said pair of bracket members having opposed ends;

means for hingedly connecting said lever with one end of said pair of bracket members;

a roller carried by the other end of said pair of bracket members;

guide means including a guide slot coacting with said roller;

said guide means including a guide lever which when actuated pivots said lifting forks;

said roller sliding within said guide slot without pivoting said guide lever during such time as said second shaft moves through said first angular range; and

said roller bearing at an end of said guide slot and pivotally actuating said guide lever during such time as said second shaft moves through said second angular range.

4,420,862

APPARATUS FOR MAKING SLATS FOR A SLATTED BLIND

Gerardus H. Edixhoven, Voorschoten, Netherlands, assignor to Hunter Douglas International N.V., Curacao, Netherlands

Filed Jun. 12, 1981, Ser. No. 273,042

Claims priority, application Fed. Rep. of Germany, Jul. 1, 1980, 3024832

Int. Cl.³ B23P *19/00*

U.S. Cl. 29—24.5 **12 Claims**

1. Apparatus for making slats for a slatted blind, said apparatus comprising, in combination:

(a) means for mounting a supply roll of slat-forming strip material;

(b) drive means effective to draw strip material from said supply roll;

(c) a guide channel positioned to receive a loop of said strip material drawn by said drive means to form a loop having an outer surface and an inner surface;

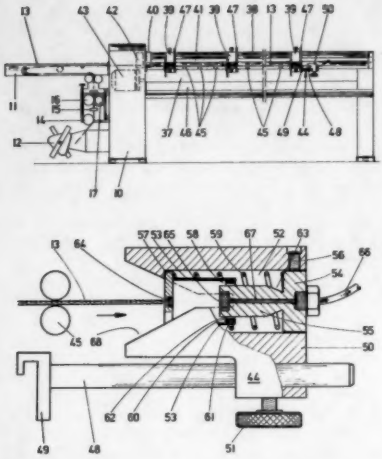
(d) a discharge table positioned to receive strip material from said guide channel;

(e) machining and/or assembly stations positioned in the region of said discharge table;

(f) an end stop associated with said discharge table movable to a predetermined position on said table for determining the length of the finished slat;

(g) an advancing member movable in the longitudinal direc-

tion of said guide channel and engagable by the end of said loop; and,



(h) resilient means urging the advancing member towards said discharge table for effecting conveyance of the strip material onto said discharge table.

4,420,863

CANE CRUSHING APPARATUS

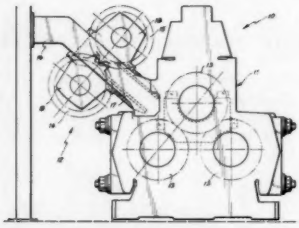
Raymond W. Trimmer, Oatley, and Morris B. McCullagh, Double Bay, both of Australia, assignors to Polymex Pty. Limited, Sydney, Australia

Filed Jul. 10, 1981, Ser. No. 282,093

Claims priority, application Australia, Jul. 10, 1980, PE4464

Int. Cl.³ A01B *29/00*; B21B *31/08*

U.S. Cl. 29—121.5 **6 Claims**



1. Apparatus for feeding sugar cane to a sugar cane crushing mill, said apparatus comprising a pair of opposed rotatable feeder rollers, on inlet chute to feed sugar cane between said feeder rollers and an outlet chute to direct sugar cane from said feeder rollers to the intake of the crushing mill, each of said feeder rollers having a central shaft, a plurality of disks coaxial with said shaft and extending radially therefrom, said disks being longitudinally spaced along each said shaft; said disks having outer radial peripheral surfaces which are provided with a plurality of spaced radially extending teeth of dimensions suitable to impel the sugar cane between said feeder rollers and through said outlet chute to the intake of said crushing mill, said pair of opposed feeder rollers being separated in the region of the nip thereof such that arcs described by the outer radial periphery of the teeth of one of said feeder rollers overlaps the arc described by the outer radial periphery of the teeth of the other of said feeder rollers, said opposed feeder rollers being mounted to rotate synchronously with the teeth of one of said opposed feeder rollers intermeshing between but without contacting the teeth of the other of said feeder rollers.

4,420,864

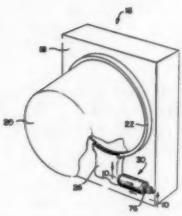
BOLT TYPE LOCK PULLER

Richard E. Hoyt, Worcester, Mass., assignor to Omco, Inc., Holden, Mass.

Continuation-in-part of Ser. No. 102,925, Dec. 12, 1979, abandoned. This application Feb. 24, 1981, Ser. No. 237,618

Int. Cl.³ B23P *19/04*

U.S. Cl. 29—263 **2 Claims**



1. A bolt type lock puller comprising:

(a) a hollow sleeve having an open leading end and a closed trailing end in which an axially centered circular aperture is provided, said sleeve having a longitudinally extending slot provided therein;

(b) an extractor mounted to axially reciprocate within said sleeve, said extractor having two split jaws at its leading end, said jaws constrained for limited transverse movement relative to each other;

(c) said extractor jaws having opposed pairs of teeth positioned to clamp around and bite into the cylindrical head of a bolt type lock having a radius of curvature which is greater than the radius of curvature of said teeth, each said pair of teeth extending over an arc of between 60° and 150° on each said jaw;

(d) means for releasably closing said split jaws by transversely moving said jaws towards each other to progressively bite into the head of a bolt type lock from an initial four point contact and to tightly grip the head of the bolt type lock, said jaw closing means including a transverse screw threadably engaging one said jaw and extending through the other said jaw, said transverse screw adapted to be acted upon by a tool to transversely draw said two jaws towards each other, a transverse pin extending through said split jaws, extending into and riding along said longitudinally extending sleeve slot; and

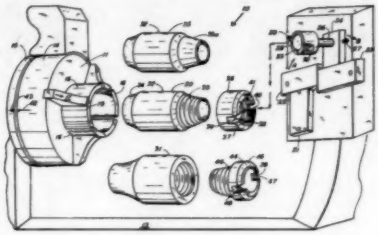
(e) means for reciprocating said extractor relative to said sleeve to pull the tightly gripped bolt type lock into said sleeve, said extractor reciprocating means including a longitudinal stud affixed to said extractor and extending through said sleeve trailing end aperture, said longitudinal stud adapted to be acted upon by a tool to axially move said extractor within said sleeve, said split extractor jaws constrained for limited transverse movement and fixed against axial movement relative to said longitudinal stud.

4,420,865

METHOD FOR RETHREADING TUBULAR MEMBERS

Jerry Haygood, Houston, Tex., assignor to Reed Tubular Products Co., Sugarland, Tex.

Filed Nov. 6, 1981, Ser. No. 318,909
Int. Cl.³ B23P 6/00
U.S. Cl. 29—402.19 9 Claims



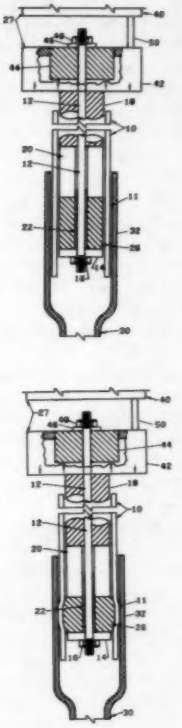
1. A method of rethreading and resurfacing a threaded tubular member having damaged or defective threads or a damaged or defective sealing surface; said method comprising:
placing in the spindle of a numerically-controlled machining system, a blank tubular member to be threaded;
actuating a standard numerical production program of the machining system to form a standard acceptable thread and sealing surface for the blank member;
placing a preselected threaded adapter on the newly formed threads in tight engagement therewith, while said tubular member is still engaged in said machining system; said adapter having alignment means formed therein;
actuating a preprogrammed position in said machining system thereby advancing the turret toward said adapter to a preprogrammed stopping point;
releasing a sliding locator assembly from said turret and sliding it into aligning engagement with said alignment means in said adapter;
locking said locator assembly in said turret while it is engaged in said adapter;
actuating said program in said machine system to withdraw said turret and locator assembly from said adapter;
removing said adapter from said standard threaded blank;
removing said standard threaded blank from the collet of said spindle;
placing a tubular piece to be rethreaded loosely in said collet of said spindle;
threading said adapter onto the threads of said tubular piece in tight engagement;
aligning said spindle radially with a fixed position on said machine system;
actuating said program in said machine system to move said turret to said preprogrammed stopping point;
sliding and rotating said loosely held tubular piece and adapter until said adapter fittingly engages said locator assembly;
activating said machine system to lock said tubular piece in the collets of said spindle;
actuating said machine system to withdraw said turret to disengage said locator assembly from said adapter;
removing said adapter from said tubular piece; and,
activating a rework program in said machine system to form a standard thread and seal surface on said tubular piece a predetermined distance into said piece further than said production program, wherein said predetermined distance is some multiple, including a single multiple, of the width of one standard thread.

4,420,866

APPARATUS AND PROCESS FOR SELECTIVELY EXPANDING TO JOIN ONE TUBE INTO ANOTHER TUBE

Richard A. Mueller, Tulsa, Okla., assignor to Cities Service Company, Tulsa, Okla.

Filed Jan. 25, 1982, Ser. No. 342,252
Int. Cl.³ B23P 17/00; B21D 39/08, 39/20
U.S. Cl. 29—421 R 14 Claims



1. An apparatus for joining at least one pair of tubes by selectively radially expanding a first tube into a second tube in proximity to their respective ends to form a selective interference fit between the tubes comprising:
(a) the first tube including a shaft extending axially therein;
(b) an inner cap bound to the shaft for longitudinal axial movement in combination with the shaft with respect to the first tube;
(c) an outer cap slidably mounted on and along the shaft for longitudinal axial movement on and along the shaft with respect to the first tube, said outer cap including at least one prong means bound thereto;
(d) a bushing means slidably mounted on and along the shaft between the outer cap and the inner cap for longitudinal axial movement on and along the shaft with respect to the first tube, said bushing means including a structure defining at least one longitudinal slot which longitudinally traverses said bushing means, said longitudinal slot registering said prong means therein;
(e) an elastomeric means slidably lodged within the longitudinal slot of said bushing means;
(f) the second tube with an end sleeve segment having a greater diameter than the first tube, said end sleeve seg-

ment defining a female opening to slidably mate with an end segment of said first tube, which includes the elastomeric means therein, such that the inner surface of the end sleeve segment of the second tube overlaps the outer surface of the end segment of the first tube; and

(g) a means for pulling the shaft in one axial direction while simultaneously pushing the outer cap in the opposite axial direction such that when the inner cap contacts the bushing means and the prong means contacts the elastomeric means the continuing respective axial forces from pulling and pushing, in combination with the prong means of the outer cap in contact with the elastomeric means within the longitudinal slot, compress and thereby radially expand the elastomeric means at predetermined selective points against the end segment wall of the first tube causing said wall to expand against the inner surface of the end sleeve segment of the second tube to form a selective interference fit therebetween.

8. A process for joining at least one pair of tubes by selectively radially expanding a first tube into a second tube in proximity to their respective ends to form a selective interference fit between the tubes comprising the following steps:

(a) placing a shaft axially inside a first tube, said shaft having an inner cap bound thereto for longitudinal axial movement in combination with the shaft with respect to the first tube;

(b) mounting a bushing means, including at least one longitudinal slot which longitudinally traverses said bushing means, slidably on and along the shaft for longitudinal axial movement on and along the shaft with respect to the first tube, said bushing means having an elastomeric means slidably lodged within said longitudinal slot;

(c) mounting an outer cap, including at least one prong means bound thereto, slidably on and along the shaft for longitudinal axial movement on and along the shaft with respect to the first tube such that said prong means is slidably lodged within the longitudinal slot of said bushing means, said outer cap positioned on the shaft such that the elastomeric means is between said prong means and said inner cap;

(d) sizing an end sleeve segment of the second tube such that said end sleeve segment has a larger diameter than the first tube;

(e) registering an end segment of the first tube, which includes the elastomeric means therein, within the end sleeve segment of the second tube such that the inner surface of the end sleeve segment of the second tube overlaps the end segment outer surface of the first tube; and

(f) pulling the shaft in one axial direction while simultaneously pushing the outer cap in the opposite axial direction such that when the inner cap contacts the bushing means and the prong means of said outer cap contacts the elastomeric means the continuing respective axial forces from pulling and pushing, in combination with the prong means of the outer cap in contact with the elastomeric means within the longitudinal slot, compress and thereby radially expand the elastomeric means at predetermined selective locations against the end segment wall of the first tube causing selective radial expansion of the wall of the first tube end segment against the inner surface of the end sleeve segment of the second tube to form a selective interference fit therebetween.

4,420,867

METHOD OF PRESSURE FITTING A TUBE IN A TUBE SHEET

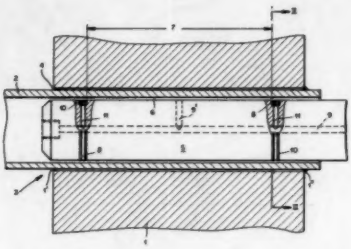
Wilfried Busse, Harkortstrassee 8-10, 4630 Bochum 6, Fed. Rep. of Germany

Filed Feb. 16, 1982, Ser. No. 349,258

Claims priority, application Fed. Rep. of Germany, Feb. 17, 1981, 3105736

Int. Cl.³ B23P *17/00;* **B21D** *19/00, 53/00*

U.S. Cl. 29—421 R **5 Claims**



1. A method of force-fitting a tube end in a plate such as a tube sheet, comprising the steps of:

inserting a tube end in a bore formed in a plate;

introducing into said tube end within said bore, an expansion mandrel so that the mandrel is received with clearance within said tube end;

forcing a fluid under pressure through said mandrel and urging a pair of seals outwardly under fluid pressure into engagement with an inner wall of said tube end to seal said clearance between said seals of an expansion zone;

supplying said fluid through said mandrel to said zone at a pressure sufficient to expand said tube end and force-fit the same in said wall.

4,420,868

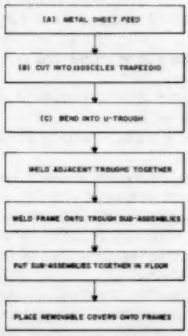
TROUGH MANUFACTURING PROCESS

Stephen N. McEwen; Robert L. Stevens, and Barry R. Benschoter, all of Bowling Green, Ohio, assignors to Henry Filters, Inc., Bowling Green, Ohio

Filed Jun. 22, 1981, Ser. No. 276,059

Int. Cl.³ B23P *19/04*

U.S. Cl. 29—460 **18 Claims**


(A) METAL SHEET FEED
(B) CUT INTO ISOSCELES TRAPEZOID
(C) BEND INTO U-TROUGH
WELD ADJACENT TROUGHS TOGETHER
WELD FRAME ONTO TROUGH SUB-ASSEMBLIES
PUT SUB-ASSEMBLIES TOGETHER IN FLOOR
PLACE REMOVABLE COVERS ONTO FRAMES

1. The method of making a section of troughing having parallel vertical side walls joined by an arcuate, semi-cylindrical, continuous bottom wall which slopes at a predetermined pitch when the free upper edges of the side walls are in the same horizontal, the steps of:

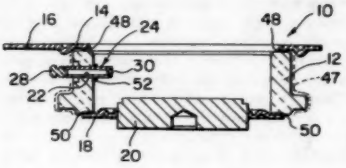
(A) forming a regular trapezoidal blank having oppositely and equally inclined longitudinal edges defining the upper extremities of the side wall portions of the finished trough section, having a central longitudinal portion destined to form the bottom of the finished section, and having parallel side edges of unequal length,
(B) securing the blank beneath a cylindrical forming die which contacts the blank linearly at the juncture of one side wall portion,
(C) contacting the undersurface of the blank with a forming roll urging the blank into contact with the forming die, and
(D) in a single uninterrupted motion, displacing the forming roll in an arcuate path concentric with said forming die and through an arc of at least 180° to bend the blank bottom to its final semi-cylindrical configuration and to align the blank longitudinal edges with one another.

4,420,869

METHOD OF MANUFACTURING A THYRISTER HOUSING

Gunduz Erkan, Middletown, and George Scott, Warwick, both of N.Y., assignors to Interceram, Inc., Middletown, N.Y.

Filed Mar. 21, 1983, Ser. No. 477,139
Int. Cl.³ H01L *21/48*
U.S. Cl. 29—460 **9 Claims**



1. The method of manufacture of a thyristor housing comprising the steps of:
a. Applying metalization coating along each generally circular edge of a generally tubular insulator and along a radially directed bore through a wall of said insulator;
b. Forming a gate tube assembly by securing metal closures sealably on opposite ends of a gate tube, in a manner that the interior of said gate tube is hermetically sealed;
c. Assembling said thyristor housing by brazing generally circular metal members, each having a generally circular periphery, on opposite ends of said insulator and respectively along the metalization coatings on opposite ends thereof and brazing said gate tube assembly in said bore with one end of said gate tube projecting radially outward from said insulator; and
d. Thereafter, plating the exposed metal surfaces of said housing.

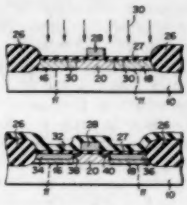
4,420,870

METHOD OF CONTROLLING CHANNEL LENGTH BY IMPLANTING THROUGH POLYCRYSTALLINE AND SINGLE CRYSTALLINE REGIONS FOLLOWED BY DIFFUSION ANNEAL

Minoru Kimura, Kawasaki, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Sep. 23, 1981, Ser. No. 304,913
Claims priority, application Japan, Oct. 9, 1980, 55-141717
Int. Cl.³ B01J *17/00*; H01L *21/265*
U.S. Cl. 29—571 **4 Claims**

1. A method for manufacturing a semiconductor device, comprising the steps of:
a. randomizing or disordering the lattice structure of an unmasked surface portion of a first single-crystalline silicon semiconductor region using a mask provided on the remaining surface portion of said first single-crystalline semiconductor region, said mask being wider than a channel to be formed on the surface of the first single-crystalline semiconductor region;
b. epitaxially forming a second single-crystalline semiconductor region on the masked portion of the first single-crystalline semiconductor region and a polycrystalline semiconductor region on that unmasked portion of the first single-crystalline semiconductor region where the lattice structure is randomized or disordered;



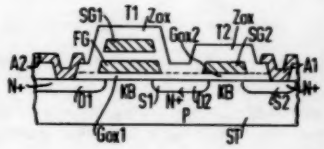
c. forming a gate on the second single-crystalline semiconductor region with an insulating film interposed therebetween, the gate being smaller in its width than that of the second single-crystalline semiconductor region; and
d. forming a source region and a drain region by introducing an impurity into the polycrystalline semiconductor region and into the portion of the second single-crystalline semiconductor region adjacent to the polycrystalline semiconductor region and subjecting the resultant semiconductor structure to heat treatment.

4,420,871

METHOD OF PRODUCING A MONOLITHICALLY INTEGRATED TWO-TRANSISTOR MEMORY CELL IN ACCORDANCE WITH MOS TECHNOLOGY

Adolf Scheibe, Ottobrunn, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Oct. 2, 1981, Ser. No. 307,884
Claims priority, application Fed. Rep. of Germany, Oct. 6, 1980, 3037744
Int. Cl.³ H01L *21/76, 21/88, 21/95*
U.S. Cl. 29—571 **9 Claims**



1. In a method of producing a monolithically integrated two-transistor memory cell in accordance with MOS technology, including a silicon crystal for accomodating the memory cell and having a surface, a first MOS field effect transistor for information storage having a current-carrying channel and both a control gate and a floating gate located between the control gate and the surface of the crystal, a second MOS field effect transistor having a current-carrying channel and a control gate, an SiO_2 film supporting the gates, a doped polycrystalline silicon layer deposited on the SiO_2 film, the control gates and the floating gate being formed by masked etching technology of the doped polycrystalline silicon layer, and an erase area apart from the current-carrying channel of the two MOS field effect transistors of the memory cell for the floating

gate of the first MOS field effect transistor, the improvement which comprises preparing the surface of the silicon crystal for implantation, initially covering a part of the surface of the silicon crystal intended for the memory cell with an SiO_2 film by thermal oxidation forming a part of the gate oxide of the first MOS field effect transistor of the memory cell, forming a window through the SiO_2 film at a location intended for the erase area of the memory cell exposing an area of the surface of the silicon crystal and leaving remaining areas of the SiO_2 film, subsequenty re-oxidizing the exposed area of the surface of the crystal in the window in the erase area and simultaneously increasing the remaining areas of the SiO_2 film to a given final thickness of the gate oxide in a further joint oxidation process producing a new thinner SiO_2 film in the window in the erase area, subsequently depositing a first doped polycrystalline silicon layer forming a base of the floating gate of the first MOS field effect transistor on the gate oxide film including the new thinner SiO_2 film, covering the doped polycrystalline silicon layer with another SiO_2 film at least in the part thereof forming the floating gate, depositing a second doped polycrystalline silicon layer on the other SiO_2 film, and forming the control gates of the first and of the second MOS field effect transistors from the second doped polycrystalline silicon layer and producing the source and drain zones of the two MOS field effect transistors by at least one of diffusion and implantation at sites on the surface of the crystal uncovered for this purpose.

4,420,872

METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE

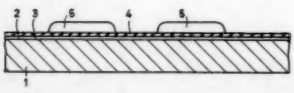
Jose Solo de Zaldivar, Zürich, Switzerland, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 22, 1981, Ser. No. 333,353

Claims priority, application Netherlands, Dec. 23, 1980, 8006996

Int. Cl.³ H01L *21/265, 21/31*

U.S. Cl. 29—571 **10 Claims**



1. A method of manufacturing a semiconductor device having at least one insulated gate field effect transistor, which comprises:

providing a silicon semiconductor body having a major surface;

providing a silicon oxide layer on said major surface;

providing a doped silicon layer on said oxide layer;

providing a silicon-nitride-containing masking layer on said silicon layer;

etching said masking layer and said underlying silicon layer into a pattern comprising at least a gate electrode;

implanting nitrogen ions into those parts of the silicon surface not underlying the silicon layer;

oxidizing the exposed parts of the silicon pattern by thermal oxidation, said masking layer masking the underlying silicon layer against said thermal oxidation; and

forming source and drain zones by ion implantation in parts of the silicon surface not underlying the silicon pattern.

4,420,873

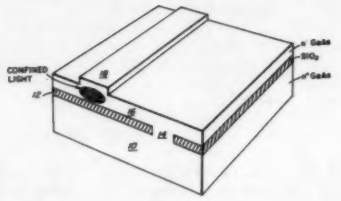
OPTICAL GUIDED WAVE DEVICES EMPLOYING SEMICONDUCTOR-INSULATOR STRUCTURES

Frederick J. Leonberger, Lexington; Ivars Melngailis, Newton; Carl O. Bozler, Sudbury, and Robert W. McClelland, Weymouth, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Jan. 25, 1980, Ser. No. 115,420

Int. Cl.³ G02B *5/172*

U.S. Cl. 29—576 E **5 Claims**



1. A method of fabricating a three-dimensional optical waveguide, comprising:

a. forming a single crystal semiconductor substrate;

b. forming an insulator layer on said substrate;

c. forming a single crystal semiconductor layer upon the insulator layer; said insulator layer having an index of refraction lower than that of said semiconductor layer, said semiconductor layer being formed to a thickness sufficient to provide confinement of light in the lower vertical direction by the boundary between the insulator layer and the semiconductor layer above and in the upper vertical direction by the boundary between the semiconductor layer and an insulator; and,

d. removing portions of said semiconductor layer to leave a three-dimensional waveguide region of single crystal semiconductor between the insulator layer on the bottom and the semiconductor layer on the top and creating an effective larger index of refraction on two sides of said three-dimensional waveguide region to thereby provide confinement of said light in said region in the lateral direction.

4,420,874

METHOD OF PRODUCING AN IIL SEMICONDUCTOR DEVICE UTILIZING SELF-ALIGNED THICKENED OXIDE PATTERNS

Tsuneo Funatsu, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Division of Ser. No. 105,152, Dec. 19, 1979, Pat. No. 4,375,645. This application Jan. 18, 1982, Ser. No. 340,286

Claims priority, application Japan, Dec. 30, 1978, 53-165804

Int. Cl.³ H01L *21/20, 21/302*

U.S. Cl. 29—576 W **9 Claims**

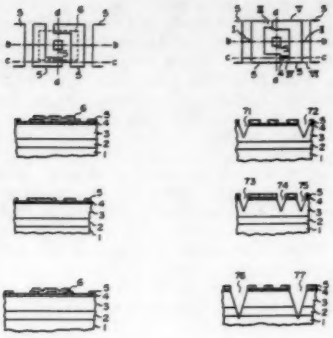
1. A method for producing a semiconductor device with plural elementary regions comprising the steps of

forming an insulating layer on a semiconductor body of a first conductivity type,

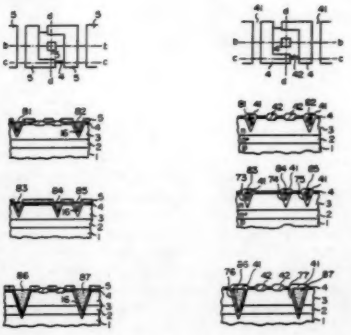
selectively forming an anti-oxidation mask layer on said insulating layer, patterning said anti-oxidation mask layer so as to determine the locations of a plurality of pairs of first regions of opposite conductivity type, and a corresponding plurality of injector regions of the opposite conductivity type, in said semiconductor body in each said elementary region,

forming shallow and deep V-shape grooves extending in respectively different directions in said semiconductor body, said deep V-shape grooves isolating each adjacent pair of elementary regions in a first direction and said

shallow V-shape grooves extending transversely to said first direction and terminating at a depth in said semiconductor body to isolate each adjacent pair of said first regions,



enlarging the thickness of predetermined portions of said insulating layer, said predetermined portions separating each said injector region from the corresponding pair of first regions,



removing said anti-oxidation mask layer, and

forming said pairs of first regions and said injector regions under said insulating layer in said semiconductor body at said locations determined by the patterning of the anti-oxidation mask layer.

4,420,875

METHOD OF MOUNTING AND CASTING A FLAT ROTOR

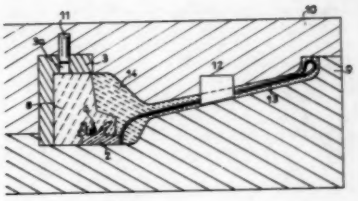
Michel Coquillart, Saint Etienne Terrenoire, France, assignor to Mavilor Systemes, Switzerland

Filed Nov. 21, 1980, Ser. No. 209,295

Claims priority, application France, Dec. 5, 1979, 79 30269

Int. Cl.³ H01R *43/08*; H02K *15/02*

U.S. Cl. 29—597 **1 Claim**



1. A method of mounting and casting flat rotors of electric motors, comprising the following successive operational steps:

first, angularly positioning within a first mold, an inner tubular casing and a commutator having segments, wherein the angular positioning of said tubular casing in said first mold is performed by at least one indexing finger which is present in said first mold, said at least one indexing finger of said first mold traverses at least one orifice in said inner tubular casing, and another at least one indexing finger goes between said segments of said commutator so as to assure the proper orientation of said commutator in said first mold in relation to said inner tubular casing;

second, pouring a suitable resin into said first mold between said tubular casing and said commutator forming a molded commutator;

third, crimping a winding coil-by-coil onto said molded commutator;

fourth, separating said commutator segments of said molded commutator and windings;

fifth, angularly positioning within a second mold, said molded commutator and windings, wherein the angular positioning of said molded commutator and windings in said second mold is performed by at least one indexing key which is present in said second mold and which fits between said coils to assure proper orientation of said coils in relation to at least one indexing finger in said second mold for positioning said inner tubular casing, whereby said two angular positioning steps ensures correct adjustment of said commutator because said segments of said commutator are correctly positioned with respect to said tubular casing in said first mold and said windings are

correctly positioned with respect to said tubular casing in said second mold so that said windings and said commutator segments are correctly positioned with respect to one another; and

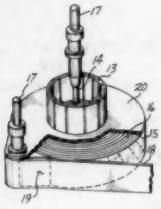
sixth, pouring suitable resin into said second mold, so as to coat said windings with resin.

4,420,876

METHOD OF COIL ASSEMBLY FOR HOT MELT INDUCTION HEATER APPARATUS

Arthur W. McDermott, Maple Valley, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed May 6, 1981, Ser. No. 260,970
Int. Cl.³ H05B *3/00*
U.S. Cl. 29—611 **7 Claims**



1. The method of making an induction heating coil (10) comprising the steps of:

providing a conductor (16) having a rectangular cross sectional area and an inside end;

brazing an inner terminal lead (14) to said inside end of said conductor (16) with a high-temperature braze alloy;

wrapping said conductor (16) by winding in spiral overlap fashion a polyimide tape (15) around said conductor (16) said polyimide tape (15) having a fluorocarbon resin coating on both sides;

winding under tension a plurality of turns of said conductor (16) so that opposing surfaces of said fluorocarbon resin coatings between windings of said conductor (16) are in direct contact;

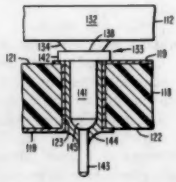
after winding of the last conductor turn (16), forming of an outer terminal lead at 90° to the coil body (11), and subsequently high temperature brazing inner (17) and outer (17) terminals to said leads; inserting wedges (19) to stabilize said outer terminal lead (17), and then winding a further plurality of turns on the coil periphery with dielectric polyimide tape (18).

4,420,877

SELF-MASKING SOCKET PIN CARRIER FOR PRINTED CIRCUIT BOARDS

Joseph A. McKenzie, Jr., 6330 Laura La., Pleasanton, Calif. 94566

Filed Mar. 19, 1981, Ser. No. 245,442
Int. Cl.³ B23P *19/00*
U.S. Cl. 29—739 **20 Claims**



1. A tool for fabricating an electrical socket within a non-conductive substrate of a printed circuit board, said fabricated socket having at least one electrical receptacle contact body defining an opening for receiving an electrical contact pin terminal of an electrical plug, said receptacle contact body secured by solder within a terminal lead-hole formed in said substrate with its opening exposed to receive said contact pin terminal, said tool comprising:

a support structure including a support block to which is secured a pin structure for receiving and releasably supporting each receptacle contact body for insertion and soldering in the lead-hole of the substrate so that the opening of said receptacle contact body of the fabricated electrical socket is exposed to receive the contact pin of the electrical plug; and

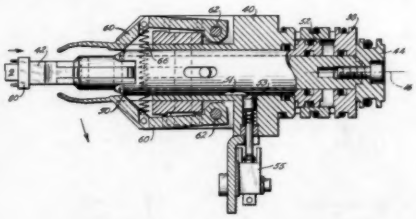
a barrier structure defined by a transition body joined to the support block and pin structure for covering the opening of the receptacle contact body supported by said pin structure, said pin structure and transition body having configurations and dimensions enabling said pin structure to be inserted into said receptacle contact body through its opening and support same with said transition body closing said opening to prevent solder applied to said receptacle contact body to secure same within the lead-hole from entering said opening.

4,420,878

INSERTION HEAD FOR DIP AND DIP SOCKET COMPONENTS

James W. Tripp, Whitney Point, and John Schoenmaker, Greene, both of N.Y., assignors to Universal Instruments Corporation, Binghamton, N.Y.

Filed Feb. 23, 1982, Ser. No. 351,416
Int. Cl.³ H05K *3/30*
U.S. Cl. 29—741 **4 Claims**



1. An apparatus for picking up DIP and DIP socket components and population of said components in a laterally spaced relation on a circuit board having lead receiving holes, each of said components having a lateral dimension and comprising a body and substantially parallel leads extending generally in a perpendicular direction away from a planar surface of said body said lateral dimension including body width and lead spacing and said DIP socket lateral dimension being greater than said DIP lateral dimension said apparatus comprising:

a tooling head movable toward and away from said circuit board along a longitudinal axis for insertion of said leads in said holes, said head comprising spring-biased guide jaws each pivotally attached at one end and free at the other end, said other end having guide grooves, such that said guide jaws are spring-biased toward a closed position and engageable with said leads to guide said leads during insertion thereof into said holes;

pusher means extensible and retractable relative to said tooling head along said longitudinal axis and engageable with said body;

primary cam means for opening said guide jaw other ends in opposition to said spring biasing to a spacing sufficient to clear said component lateral dimension during said picking up and insertion, and for controlling the rate of biased clo-

sure of said grooves onto said leads during reception of said component in said tooling head;

means for controlling the spacing of said guide jaw other ends after insertion of said leads into said holes by opening said guide jaw ends less than said primary cam means such that said laterally spaced relation of adjacent components is minimized; and

means for actuating said primary cam means, said pusher means, said movable tooling head, and said spacing controlling means upon command.

4,420,879

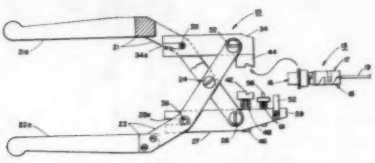
DEVICE FOR OPENING SNAP-LOCKED HOUSING SECTIONS OF A CABLE CONNECTOR

Robert V. Harringer, Joliet, Ill., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Feb. 26, 1982, Ser. No. 352,746

Int. Cl.³ H01R *43/00*

U.S. Cl. 29—764 **11 Claims**



1. A device for releasing and separating a first housing section from a second housing section of a cable connector, wherein the first and second housing sections are normally releasably secured together by a pair of laterally spaced, side-wall-located snap-locked latches, and wherein the second housing section is fixedly secured to a third housing section, said device comprising:

first and second pivotally connected handle-defining gripping members;

first and second jaw means respectively connected to said first and second gripping members, said jaw means, in response to a compressive force manually exerted on the handle portions of said gripping members, acting to precisely position and resiliently clamp the third housing section of a connector when interposed therebetween;

first and second laterally disposed latch-releasing members mounted on one of said first and second jaw means, each of said latch-releasing members being positioned, and having a terminated end acting to engage and effect the release of a different one of the latches of a clamped connector, and

biasing means mounted on the same one of said first and second jaw means as said latch releasing members, said biasing means being positioned so as to contact and effect the displacement of the first connector housing section, when released, a predetermined distance from the second housing section.

4,420,880

DEVICE FOR EXTRACTING AN IN-LINE ARRAY OF SOCKET-MOUNTED CIRCUIT PACKAGES OF THE DUAL-IN-LINE-TYPE

Robert W. Mielke, Warrenville, Ill., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Apr. 29, 1982, Ser. No. 373,195

Int. Cl.³ B23P *19/00*; H01R *43/00*

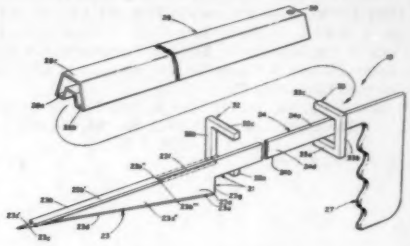
U.S. Cl. 29—764 **15 Claims**

1. An extraction device for successively removing a linear array of multi-leaded integrated circuit packages, of the type having dual-in-line leads, from a corresponding array of respectively associated support board-mounted sockets, and for facilitating the temporary replaceable-magazine storage of such extracted circuit packages, and wherein each socket is formed with a guide slot that communicates with the upper surface thereof, and which slot is positioned to extend parallel to, and be interposed between, the laterally spaced rows of leads of a socket-mounted circuit package, said extraction device comprising:

an elongated composite body member that includes:

a. a forward wedge-shaped portion having an upper, longitudinally extending and inclined ramp for effecting the successive extraction of an array of socket-mounted circuit packages, and guiding the latter in back-to-back relationship into a replaceable storage magazine when mounted on said device, said wedge-shaped portion further having a lower edge from which a thin, longitudinally extending socket slot-receiving rib projects downwardly a predetermined distance;

b. an elongated rearward portion having an upper edge that is particularly for supporting the intermediate leg



portion of a substantially U-shaped type of circuit package storage magazine along at least a major portion of the longitudinal length of the latter, said upper magazine-supporting edge being co-linear with, but substantially narrower than, the width of said wedge-shaped portion ramp, and

c. a handle portion positioned at a predetermined point along said rearward magazine-supporting portion, and extending downwardly therefrom, said extraction device further including:

bracket means secured to said rearward body member portion, and cooperating with opposite major sides and said upper magazine-supporting edge of said rearward portion to define on each side of the latter at least one substantially enclosing channel area, each of said opposite side channel areas receiving a longitudinal section of a different leg portion of a storage magazine of the U-shaped type to be removably confined therewithin.

4,420,881

METHOD OF MANUFACTURING A PREFORM FOR MINERAL-INSULATED ELECTRIC CABLE

Jean-Claude Bourget, Issy les Moulineaux, France, assignor to Les Cables de Lyon, Lyons, France

Filed Sep. 11, 1981, Ser. No. 301,483

Claims priority, application France, Sep. 23, 1980, 80 20393

Int. Cl.³ H01R *43/00*

U.S. Cl. 29—825 **5 Claims**

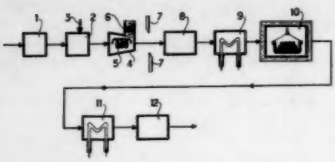
1. A method of manufacturing a preform made of an electrically insulating mineral substance for an electric cable having compressed mineral insulation, said method comprising the steps of:

(a) mixing the mineral insulating substance with an organic binder;

(b) extruding a cylindrical structure which has at least one internal duct;

(c) cutting the extruded cylindrical structure into portions of a length corresponding to the size of a chaplet of a heat treating furnace;

(d) heat treating the portions in said furnace to cause the organic binder to burn; and



(e) inserting the portions while still hot in a metal tube forming the cable sheath and passing the conductor(s) through the internal duct(s).

4,420,882

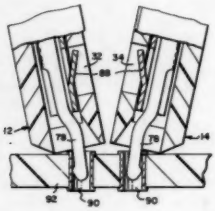
METHOD OF MOUNTING TILT LATCH ZERO INSERTION FORCE CONNECTOR TO A SUBSTRATE

Leon T. Ritchie, Mechanicsburg; Clair W. Snyder, Jr., York, both of Pa.; Thurston H. Toeppen, Poughkeepsie, N.Y., and John A. Woratyla, Camp Hill, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Division of Ser. No. 240,524, Mar. 4, 1981, Pat. No. 4,372,634. This application Sep. 2, 1982, Ser. No. 414,230

Int. Cl.³ H05K *3/30*

U.S. Cl. 29—837 **2 Claims**



1. A method of effecting zero insertion force mating of an electrical connector with a plurality of conductive holes in an array in a circuit board or the like, comprising the steps of:

forming a pair of subassemblies each comprising a housing having a mating face, a plurality of terminals in said housing each with a resilient beam portion extending from said mating face, and a cover member;

mating said subassemblies with said circuit board at a tilted angle with respect to the plane of said circuit board, said beams entering said conductive holes making only incidental contact therewith; and

rotating said subassemblies relative to each other and to said circuit board to bring said subassemblies into abutting position and said beams into contact with walls of said conductive holes.

4,420,883

PRUNING APPARATUS OF THE COMPOUND ACTION HOOK AND BLADE TYPE

Edward M. Wallace, Longmeadow; Robert G. Gosselin, Springfield, and Ernest D. Labarre, Holyoke, all of Mass., assignors to Wallace Mfg. Corp., Enfield, Conn.

Filed Jun. 26, 1981, Ser. No. 277,927

Int. Cl.³ B26B *13/26*

U.S. Cl. 30—251 **8 Claims**

1. A rope-actuated pruning apparatus incorporating a compound leverage force for oscillating a cutting blade comprising:

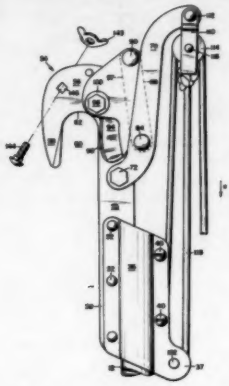
a handle,

a hook fixed to the handle and defining a downwardly-facing limb engaging-surface,

a movable blade having a cutting edge and being oscillatable for defining cutting and return strokes in intersecting relationship with the limb-engaging-surface of the hook,

a lever pivotally mounted relative to the hook,

a link pivotally connected to each of the lever and blade,



the hook and blade and lever and link being each in surface confrontation with a common vertically disposed plane,

a rope and pulley assembly operatively interconnecting with the blade through the lever and link and having a manually engageable free end for effecting pivotal movements of the blade through the cutting strokes, and

spring means for effecting movements of the blade through the return strokes.

4,420,884

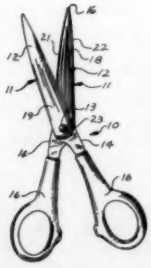
CAMMING SCISSORS

William G. Hembling, Milford, Conn., assignor to The Scott & Fetzer Company, Shelton, Conn.

Filed Dec. 11, 1981, Ser. No. 329,813

Int. Cl.³ B26B *13/06*

U.S. Cl. 30—266 **5 Claims**



1. Scissors comprising a pair of blades connected at a pivot, the blades each having mutually cooperating elongate cutting portions on one side of the pivot and handle shank portions on the opposite side of the pivot, said blades being pivotal about said pivot from an open position in which said cutting portions form an acute angle to a closed position where they are generally superposed, said blades being formed from sheet steel and being of generally uniform thickness, said blades having inner and outer faces, said inner faces being concave substantially along the full length of said cutting portions and said outer

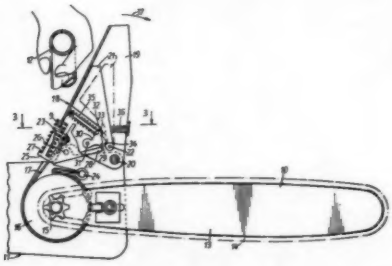
faces of said cutting portions being correspondingly convex, the profile of said cutting portion faces being substantially described by lead and trailing edges, the lead edges of said cutting portions forming the cutting surfaces of said blades, the shank portion of a blade including integral cam means embossed in the sheet material of its body to tilt the blades relative to one another to promote contact between the cutting edges of said blades and avoid contact of said trailing edges of said blades, the cam means embossment being disposed on the arc of a circle generally concentric with said pivot, the shank portion between said cam embossment and said pivot comprising substantially entirely a hollow spheroidal area which merges smoothly with the associated cutting portion whereby the cam embossment and spheroidal shank area are mutually reinforced and stiffened.

4,420,885

POWER TOOL WITH IMPROVED BRAKING DEVICE

Giuseppe Todero, Mandello del Lario, Italy, assignor to Black & Decker Inc., Newark, Del.

Filed Apr. 15, 1982, Ser. No. 368,514
Claims priority, application Italy, Apr. 17, 1981, 21266 A/81
Int. Cl.³ B27B *17/02*
U.S. Cl. 30—381 **22 Claims**



1. A portable power tool, comprising:

means for driving the tool;

means for transmitting power from said driving means to the tool;

means, operable on said transmitting means from an inoperative condition to an operative condition, for braking the tool;

first energy storage means for applying said brake means;

safety lever means, operable to release said first energy storage means, for applying said brake means when said safety lever means contacts an operator's hand, wrist or arm during kick-back or like violent movement of the tool;

second energy storage means, operable independently of said safety lever means, for releasing said first energy storage means; and

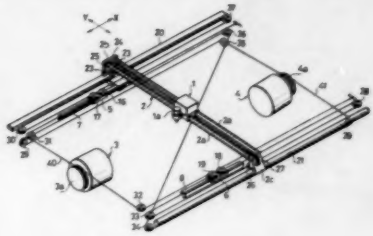
an inertia mass displaceable effectively independently of said safety lever means when said brake means is in the inoperative condition, said inertia mass releasing said second energy storage means which in turn releases said first energy storage means to apply said brake means, upon occurrence of kick-back or like violent movement of the tool.

4,420,886

X-Y PLOTTER FOR PRODUCING DIAGRAMS FROM COMPUTER INFORMATION

Toshiaki Amano, 50-2 Aza-kami-Imoda, Oaza-Imoda, Tamayama-mura, Iwate-gun, Iwate-ken, Japan

Filed Nov. 16, 1981, Ser. No. 321,698
Claims priority, application Japan, Nov. 14, 1980, 55-160342
Int. Cl.³ G01D *15/16*; F16H *55/52*
U.S. Cl. 33—1 M **4 Claims**



1. An X-Y plotter comprising:

(a) a frame

(b) a pen carriage equipped with recording pen means to make marks on a recording surface;

(c) a slider upon which said pen carriage is movably mounted for sliding motion in a first direction thereon, said slider means being movably mounted on said frame for sliding motion in a second direction orthogonal to the direction of pen carriage movement;

(d) a first driving means for moving said pen carriage along said slider, which comprises a first driving motor and a first wire mounted in a closed loop not fixed to said frame, said loop including said motor and said pen carriage;

(e) a second driving means for moving said slider in said second direction, which comprises a second driving motor and a second wire mounted in a closed loop not fixed to said frame including said second motor and said slider; and

(f) tension means engaging said first wire for keeping said first wire free from slack;

wherein said tension means comprises slide means which is equipped with a pair of pulleys, one of which engages said first wire and is movable along guide means in the second direction; and a slack-preventing wire having one end fixed to said slider and the other end fixed to said frame and engaging another pulley of said slide means so that said slack-preventing wire keeps said first wire free from slack through said slide means.

4,420,887

INSTRUMENT FOR MEASURING A LENGTH

Hideo Sakata; Ichiro Mizuno; Masao Nakahara, and Takasi Sanpei, all of Kawasaki, Japan, assignors to Mitutoyo Mfg. Co., Ltd., Tokyo, Japan

Filed Jul. 13, 1982, Ser. No. 397,942
Claims priority, application Japan, Jul. 21, 1981, 56-108515[U]; Nov. 21, 1981, 56-187350
Int. Cl.³ G01B *5/00*
U.S. Cl. 33—147 F **9 Claims**

1. An instrument for measuring a length, comprising:

a main frame means which includes an anvil and elongated guide means, the axis of which is aligned with said anvil;

an elongated spindle linearly movable in the axial direction of said elongated guide means, said spindle having means defining a rack thereon;

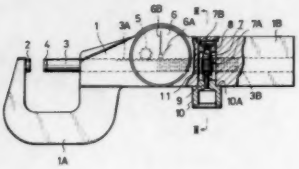
length indicating gauge means responsive to an axial movement of said spindle;

a pinion shaft and means rotatably mounting said pinion shaft on said main frame means, said pinion shaft having a driving gear thereon engaged with said rack so that a

rotation of said pinion shaft will effect an axial movement of said spindle, said pinion shaft further having a threaded segment thereon;

a rotary knob rotatably mounted on said main frame means and having means thereon threadedly engaging said threaded segment of said pinion shaft;

resilient means for yieldably resisting relative rotation between said pinion shaft and said rotary knob so that a rotation of said rotary knob will effect a rotation of said pinion shaft and a consequent axial movement of said spindle, said resilient means yielding and permitting the aforesaid relative movement in response to a resistance to axial movement being applied to said spindle; and



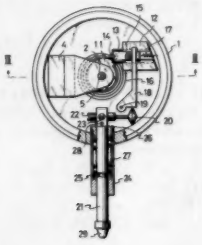
releasable locking means interposed between said rotary knob and said main frame means and being activated in response to a relative rotation between said pinion shaft and said rotary knob for locking said rotary knob against rotation and, consequently locking said spindle in a fixed position whereby when said spindle engages an object to be measured oriented in the path of movement of said spindle toward said anvil, said rotary knob will rotate relative to said pinion shaft and said releasable locking means will effect a fixing of the position of said spindle to thereby enable a visual inspection of said gauge means without inadvertantly shifting the position of said spindle and the consequent altering of the indication on said gauge means.

4,420,888

DIAL GAUGE

Masato Wakao, and Iwao Sugizaki, both of Kawasaki, Japan, assignors to Mitutoyo Mfg. Co., Ltd., Tokyo, Japan

Filed Jun. 4, 1982, Ser. No. 385,243
Claims priority, application Japan, Jun. 23, 1981, 56-97226
Int. Cl.³ G01B *3/22*
U.S. Cl. 33—172 R **4 Claims**



1. A dial gauge, comprising:

a gauge case body;

an elongated spindle protruding from said body and supported on said body for displacement toward and away from said body, and first biasing means urging said spindle in a direction outwardly from said body;

a shaft rotatably mounted within said body, an indicator hand mounted on one end of said shaft for rotation therewith, a cam member mounted on said shaft and adapted to effect rotation thereof, and second biasing means connected between said shaft and said body for urging said shaft and thereby said cam member and said indicator hand in one predetermined rotational direction;

a reciprocable member supported on said body for reciprocation toward and away from said cam member, said reciprocable member having a rotatable roller mounted thereon and abutting against the cam surface of said cam member so that reciprocation of said reciprocable member effects rotation of said cam member and thereby said shaft;

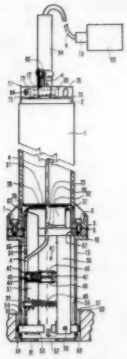
a link mechanism connected between said spindle and said reciprocable member for transmitting and multiplying a displacement of said spindle with respect to said body to effect an enlarged movement of said reciprocable member with respect to said shaft, said link mechanism being pivotally mounted at the end thereof adjacent to said spindle and the opposite end thereof being coupled to said reciprocable member, said link mechanism having a flat surface and said spindle having a driving piece connected thereto and engaging said flat surface so that movement of said spindle effects pivoting of said link mechanism.

4,420,889

PLUG COMPARATOR FOR CHECKING THE DIAMETER OF HOLES

Mario Possati; Guido Golinelli, both of Bologna, and Narciso Selleri, Monteveglio, all of Italy, assignors to Finike Italiana Marposs S.p.A., S. Marino di Bentivoglio, Italy

Filed May 29, 1981, Ser. No. 268,631
Claims priority, application Italy, Jun. 20, 1980, 3436 A/80
Int. Cl.³ G01B *3/22*
U.S. Cl. 33—178 F **3 Claims**



1. A manual plug comparator for checking the diameter of holes of mechanical parts, comprising,

a support plate defining first and second sides and at least a through hole;

an integral body including: a first section coupled to the support plate; two lightened portions connected to the first section and defining relevant fulcrum devices; and two further sections, each defining a relevant movable arm, connected to the lightened portions for rotation movement about the relevant fulcrum devices;

two feelers coupled to the movable arms, respectively, for contacting the part to be checked;

transducer means coupled to the movable arms for providing a signal responsive to the mutual position of the movable arms, the transducer means including two transducer elements coupled to the movable arms, respctively, each transducer element and each feeler being coupled to the relevant movable arm on the same side with respect to the relevant fulcrum device;

a hollow handle coupled to the support plate;

a protective nosepiece coupled to the support plate and

defining with the handle a geometrical longitudinal axis of the plug comparator, the nosepiece substantially housing the arms, the arms being substantially arranged along said longitudinal axis and passing through said through hole of the support plate, the nosepiece further defining two openings for the passage of the feelers;

wherein the handle, the support plate and the nosepiece define an internal chamber and the handle and the nosepiece have bases spaced along said longitudinal axis, these bases defining further openings for carrying out a cleaning operation inside said chamber by introduction of a pressurized fluid through one of said further openings, the flow of the fluid within the chamber, substantially along said longitudinal axis, for removing any foreign matter, and the discharge of the fluid to the outside of the plug comparator.

4,420,890

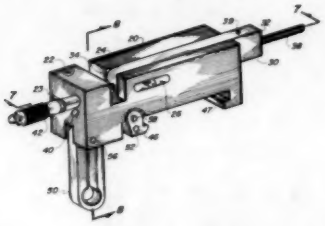
MICROMETER ADJUSTABLE BACKGAUGE

Nelson A. Naylor, 3941 Rocky View Dr., Norco, Calif. 91760

Filed Feb. 22, 1982, Ser. No. 350,718

Int. Cl.³ G01B *5/02*; B21D *11/22*

U.S. Cl. 33—180 R **8 Claims**



1. A micrometer adjustable backgauge for locating a workpiece in a machine tool press brake, having a mechanical adjustable backgauge comprising:

(a) a body having a first and second end, said body including means for attaching said body to said press brake,

(b) an adjustable probe having means on one end pivotally and slideable mounting said probe on said body for sliding movement toward and away from said press brake and pivotal movement about an axis parallel to said press brake, the other end of said probe extending outward from the body for engaging said workpiece, and,

(c) a micrometer head having a sleeve, thimble and spindle compressedly affixed into said body first end at said sleeve with said thimble extending outward from the body and said spindle contiguous to said probe for adjustably positioning said probe from said body.

4,420,891

FRAMING AND LAYOUT SQUARE

Howard L. Orem, Petrolia, Calif., assignor to Richard B. Cogswell, Hinsdale, Ill.

Filed Aug. 5, 1981, Ser. No. 290,351

Int. Cl.³ B43L *7/00*

U.S. Cl. 33—476 **9 Claims**

1. A framing and layout square of unitary construction comprising a blade and a tongue, each of which have flat upper and lower surfaces, said blade and tongue disposed coplanarly and perpendicularly each to the other, said bladé having an interior rectilinear lateral edge and an exterior rectilinear lateral edge, each of which include a linear measurement scale defined thereon, an elongated slot defined in said blade of sufficient width to provide a sight opening for aligning the edge of a piece of lumber, said slot arranged parallel to and disposed between the lateral edges of the blade, said slot including first and second measurement edges disposed at either side thereof, said blade inluding a first angular measurement scale defined along said first edge of said slot graduated from 0° to 45° and a second angular measurement scale defined along said second edge of said slot graduated from 45° to 90°, said first and second angular measurement scales arranged such that they are positioned in reciprocal alignment with each other, said tongue having an interior rectilinear lateral edge, and an exterior

rectilinear lateral edge, each of which include a linear measurement scale defined thereon, said tongue also including a terminal edge extending between and joining said exterior and interior edges of said tongue, said edge disposed at an angle of substantially 45° to the exterior lateral edge of the tongue and an index point defined at the intersection of said terminal edge of said tongue and said interior rectilinear edge thereof.

4,420,892

THIN FILM CONTACT DRYER

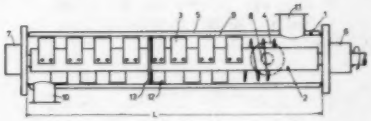
Burkhard Braun; Bernhard Vosteen; Reiner Skerhut, all of Cologne, Fed. Rep. of Germany, and Adolf Sinn, Muri, Switzerland, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 126,764, Mar. 3, 1980, abandoned. This application Jan. 29, 1982, Ser. No. 343,791

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1979, 2911549

Int. Cl.³ F26B *17/20*

U.S. Cl. 34—183 **8 Claims**



1. A thin film contact dryer comprising a stationary housing having a closed cylindrical internal wall, an inlet at one end and an outlet at the other end, means for heating the housing wall, means for effecting an axial flow from the inlet to the outlet and a rotor mounted for rotation in the housing and extending longitudinally throughout the length thereof, wherein along the rotor between the inlet and the outlet is arranged a unit comprising at least one combination of distributing elements and an annular weir which revolves with the rotor and leaves a constant 360° narrow annular gap open with respect to the internal wall of the housing, the distributing elements being bent back with respect to the direction of rotation to form wedge shaped corners with the internal surface of the housing and the annular weir being disposed immediately downstream of the distributing elements in the direction of

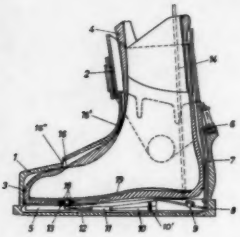
axial flow and apertured in an annular region adjacent to said rotor to permit vapor flow therethrough.

4,420,893

SHOE COMPRISING A SYSTEM FOR SUPPLYING AIR TO THE INTERIOR OF THE SHOE

Walter Stephan, Ried im Innkreis, Austria, assignor to Fischer Gesellschaft M.B.H., Ried im Innkreis, Austria

Filed Nov. 10, 1981, Ser. No. 320,076
Int. Cl.³ A43B *7/06, 7/08*
U.S. Cl. 36—3 R **4 Claims**



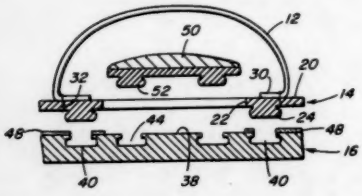
1. In a ski boot of the type having a shell, a gaiter which is pivotally mounted on the shell and movable in the longitudinal direction of the boot, an inner shoe and a wedge-shaped hollow section below the outer portion of the sole of the inner shoe, a system for supplying air to the interior of the boot comprising:
an air handling device mounted on the shell of the boot;
an actuating means operatively connected at one end to the air handling device and connected at the other end to the rear side of the gaiter directly above the heel;
one or more nozzles which are embedded in the walls of the inner shoe;
one or more conduits for air passage which are connected at one end to the air handling device and at the other end to the nozzle;
air passage openings in the top of the inner shoe on the side remote from the actuating means; and
openings in the shell of the boot on the side remote from the actuating means for air exhaust to the outside of the boot.

4,420,894

SNAP SHOE

Joel Glassman, 500 Bowling Ave., Nashville, Tenn. 37205

Filed Apr. 19, 1982, Ser. No. 369,653
Int. Cl.³ A43B *13/28, 13/42, 23/00*
U.S. Cl. 36—12 **1 Claim**



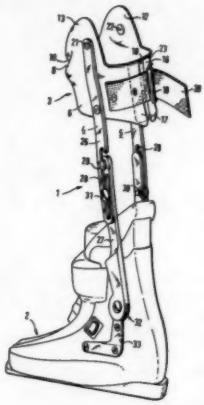
1. In a shoe comprising:
a first sole means,
said first sole means comprising an insole having a lip surrounding a central opening,
said first sole means also having a plurality of attaching members disposed on and extending from a bottom surface of said lip of said insole,
each said attaching member comprising an elongated domed-shaped snap, said snaps and said insole being molded of a single piece of plastic,
said lip having an upper stitched thereto,
a second sole means comprising an outsole,
said outsole having a plurality of receiving members in one surface, said receiving members being inverted, elongated domed-shaped openings, and
a shank,
said shank having a plurality of attaching members disposed on and extending from a bottom surface
whereby said first sole means and said shank are fixed to said second sole means to form a completed sole by engagement of said attaching members to said receiving members.

4,420,895

SKI BOOT

Peter Baumann, Gaswerkstr. 13, D-7768 Stockach, and Lutz Biedermann, Am Schäfersteig 8, D-7730 Villingen, both of Fed. Rep. of Germany

Filed Jul. 23, 1980, Ser. No. 171,390
Claims priority, application Fed. Rep. of Germany, Jul. 27, 1979, 2930648; Apr. 1, 1980, 3012716
Int. Cl.³ A43B *5/04*
U.S. Cl. 36—118 **9 Claims**



1. A ski boot comprising a boot part to receive a wearer's foot and a leg engaging part which extends upwards from and is hinged to the boot part at a hinge point, said leg engaging part being shaped and positioned so as to at least partially grip around the knee joint of the wearer.

4,420,896

METHOD FOR FABRICATION OF ELECTROSCOPIC DISPLAY DEVICES AND TRANSMISSIVE DISPLAY DEVICES FABRICATED THEREBY

Donald E. Castleberry, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Sep. 17, 1981, Ser. No. 303,275
Int. Cl.³ A47F *11/06;* **G09F** *9/00*
U.S. Cl. 40—427 **20 Claims**

1. An information display device, comprising:
first and second substantially transparent substrates, each having an interior surface spaced from and facing the interior surface of the other substrate;
at least one conductive electrode fabricated upon the interior surface of a first one of said substrates;
a conductive electrode fabricated directly upon the interior surface of the second one of said substrates and compris-

ing at least one support portion directly attached to the second substrate interior surface, at least one plate portion having a substantially circular periphery and at least one sector-shaped aperture formed therethrough within said periphery, and a plurality of arcuate spring arms each having a first end attached to a point on the periphery of an associated plate portion substantially equally spaced from adjacent spring arm attachment points and having a second end connected to an associated fixed support portion for mechanically biasing said plate portion toward said second substrate interior surface;

said plate portion being adapted for movement, against the force of said arcuate spring arms, toward said electrode fabricated upon said first substrate interior surface, responsive to the coupling of a potential between the elec-

trodes on the interior surface of said first and second substrates, and with the position of each of said at least one sector-shaped apertures rotating about a plate portion center as said plurality of arcuate spring arms are flexed by movement of said plate portion toward and away from said second substrate interior surface; and

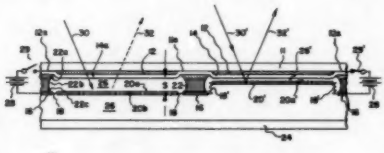
a multiplicity of reflective members each fixed to said second substrate interior surface and positioned such that light entering said display through said second substrate and reflected from that surface of said plate portion closest to said second substrate, when said plate portion is electrostatically moved closest to said first substrate electrode, is reflected from said fixed reflective members through said plate portion apertures and said first substrate and the electrode thereon.

4,420,897

ELECTROSCOPIC DISPLAY DEVICES

Donald E. Castleberry, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 18, 1982, Ser. No. 359,402
Int. Cl.³ A47F 11/06; G09F 9/00
U.S. Cl. 40—427 **11 Claims**



10

1. An information display device, comprising:

a substantially transparent substrate having a surface;

at least one conductive electrode fabricated upon the substrate surface;

a layer of a dielectric material fabricated over at least said at least one conductive electrode;

at least one additional conductive electrode comprising at least one support portion, at least one plate portion positioned in registration with an associated one of said at least one conductive electrode and each having a periphery, and spring arm means connected between each plate portion periphery and associated ones of said at least one support portion for mechanically biasing each plate portion to a resting position;

support means, attached only between each of said at least one support portion of said at least one additional electrode and one of said substrate surface and said dielectric layer, for maintaining the resting plate portion of said at least one additional conductive electrode substantially parallel to and at a predetermined distance from said dielectric layer;

a quantity of a light-absorbing liquid material; and

means only for containing said liquid material at least between said dielectric layer and said plate portion of said at least one additional conductive electrode;

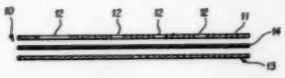
each plate portion being adapted for movement, against the force of said spring arm means, toward an associated one of said at least one conductive electrode, responsive to the coupling of a potential between that plate portion and the associated one of said at least one conductive electrode.

4,420,898

FLAT EMERGENCY EXIT SIGN UTILIZING AN ELECTRO-ILLUMINESCENT LAMP

John R. Moses, 3440 Chesapeake Walk, Annapolis, Md. 21403

Filed Mar. 1, 1982, Ser. No. 353,390
Int. Cl.³ G09F 13/04
U.S. Cl. 40—570 **3 Claims**



1. An emergency exit sign comprising:

a stencil with the term "EXIT" formed by openings therethrough;

a single, flat electro-luminescent lamp disposed behind the stencil to provide illumination through the stencil; the electro-luminescent lamp being opaque with respect to one side and being of unitary construction; the lamp comprising a lamination including a steel substrate, a layer of phosphors on the steel substrate and a layer of glass over the phosphors to seal the phosphors between the layer of glass and substrate, the lamination further including an electrode spaced from the substrate and connected to a first lead and a second lead connected to the substrate wherein the lamp glows when AC line current is applied to the leads, and

a layer of translucent phosphorescent material juxtaposed with the lamp and aligned with the opening through the stencil, the phosphorescent material being energized by the lamp and continuing to glow when power to the lamp is cut;

whereby, a flat, inexpensive exit sign is provided which has improved longetivity while consuming minimal electrical power.

4,420,899

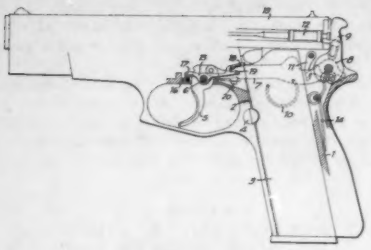
AUTOMATIC PISTOL WITH COMBINED MAGAZINE CONTROL SAFETY AND MAGAZINE EJECTION MECHANISM

Maurice V. Bourlet, Liege, and Jean-Pierre H. Storder, Namur, both of Belgium, assignors to Fabrique Nationale Herstal, Herstal, Belgium

Filed Sep. 2, 1981, Ser. No. 298,574
Claims priority, application Belgium, Oct. 16, 1980, 2/58809
Int. Cl.³ F41C 17/08
U.S. Cl. 42—70 A **4 Claims**

1. In an automatic pistol including a body, a housing in the body for accommodating a magazine, means for locking the magazine in the housing, a pivot pin, a trigger mounted on the pivot pin, a hammer, linking means including a plurality of elements defining an interruptible kinematic chain between the trigger and the hammer, and wherein the improvement comprises a lever mounted on the body, the lever having a first end and a second end, the second end including first and second

prongs, biasing means for urging the first prong against a magazine and forcing it to eject, an interrupt means carried by one of the elements defining the kinematic chain and being



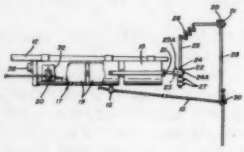
engageable by the second prong for interrupting the kinematic chain when a magazine is not locked in the housing, thereby preventing operation of the hammer by the trigger.

4,420,900

AUTOMATIC FISHING JIGGER

John M. Nestor, 2397 Penny La., Youngstown, Ohio 44515

Filed May 11, 1981, Ser. No. 262,748
Int. Cl.³ A01K *97/12*
U.S. Cl. 43—17 **7 Claims**



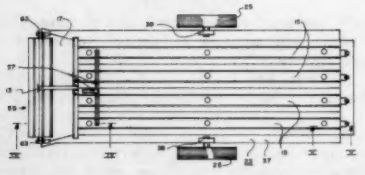
1. An automatic fishing jigger comprised of an enclosure secured to a fishing rod, a fishing line on said rod, a motor in said enclosure having a drive shaft, an arm on said drive shaft, means for flexing the arm, a line connector connected pivotally to the arm, means for detachably securing said fishing line to said line connector, an alarm device secured to said enclosure and means for activating said alarm device, a power source in said enclosure.

4,420,901

IMPLEMENT FOR FLAME TREATING SOIL

Howard Y. Clarke, 315 South Dudley, Memphis, Tenn. 38104

Filed Feb. 8, 1982, Ser. No. 347,006
Int. Cl.³ A01M *15/00*
U.S. Cl. 47—1.44 **10 Claims**



1. An implement for movement over the ground and for flame treating soil from the ground, said implement comprising:

(a) an elongated tube member having an opened first end and an opened second end, said tube member having an elongated combustion chamber and an elongated conveyor chamber, said combustion chamber being located above and in communication with said conveyor chamber;

(b) scoop means located adjacent said first end of said tube member for digging soil from the ground as said implement is moved thereover and for directing the soil into said first end of said tube member;

(c) a single elongated screw means for being mounted in said conveyor chamber of said tube member and for moving the soil from said first end of said tube member completely through said tube member and out said second end thereof; and

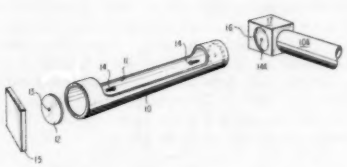
(d) an elongated burner means for being mounted in said combustion chamber of said tube member and for subjecting the soil moving through said tube member to flame substantially along the entire length of said tube member, said burner means including an elongated burner element supported within said combustion chamber of said tube member and having a plurality of downwardly directed orifices therein.

4,420,902

MODULAR PLANTING APPARATUS

Maxwell A. Rayner, 76 Hindes St., Lota, Queensland, Australia

PCT No. PCT/AU81/00012, § 371 Date Sep. 29, 1981, § 102(e) Date Sep. 29, 1981, PCT Pub. No. WO81/02087, PCT Pub. Date Aug. 6, 1981
PCT Filed Jan. 29, 1981, Ser. No. 308,553
Claims priority, application Australia, Jan. 29, 1980, PE2168
Int. Cl.³ A01G *9/00*
U.S. Cl. 47—66 **7 Claims**



1. A modular planting apparatus comprising a plurality of separate tubular modules each having a continuous side wall having an access opening therethrough whereby the interior of each module is adapted to contain planting material, an end cap secured to each end of each tubular module, at least one connector block interposed between adjoining tubular modules and connecting means associated with each connector block for connecting an adjacent end cap of a tubular module thereto.

4,420,903

SHIPPING CONTAINER FOR LIVING BOTANICALS

Alexander S. Ritter, Coral Gables, and James A. Lee, Miami, both of Fla., assignors to Far West Botanicals, Inc., Miami, Fla.

Continuation-in-part of Ser. No. 257,101, Apr. 24, 1981, abandoned. This application Apr. 23, 1982, Ser. No. 371,427
Int. Cl.³ A01G *25/00*
U.S. Cl. 47—81 **4 Claims**

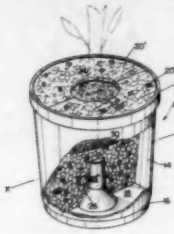
1. A plant pot for the continuous growth, shipping and transfer of a living botanical, comprising in combination:

(A) an outer pot of fluid impermeable material, said outer pot having an open end at its top and a closed end at its bottom, the bottom defining in upward extension thereof an open overfill tube;

(B) corresponding first cohesive soiless media growth fillers, said fillers being in opposed contiguous relation to each other within the pot, each said filler defining a top cavity which is less than one half the vertical cross-section of a net pot to be inserted therein, said cavity being bounded on its top by an annular rim which is of smaller horizontal

section than the top cavity, said fillers likewise defining a bottom vertical cavity to receive the overfill tube;

(C) a net pot of plastic material for the botanical, said net pot having a second growth filler contained therein, said net pot with filler being forcibly seated within the top cavity of the first growth fillers and retained therein by the annular rim aforesaid, the first growth fillers and the net pot



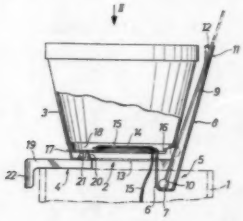
filler each containing a fluid-permeable soiless composite consisting of bonded, fibrous and spongeous matter, said first fillers together being of greater lateral dimension than the interior of the outer pot and the net pot filler being of greater volume than the top cavity defined by the first fillers, whereby the first and second fillers are compressibly held within the plant pot.

4,420,904

DEVICE FOR FEEDING POTTED PLANTS

Siegfried Joswig, Kausen/Betzdorf/Sieg; Johannes Liebscher, Nassau; Peter Keils, Obernhof, and Peter Tiwi, Fachbach, all of Fed. Rep. of Germany, assignors to International Standard Electric Corporation, New York, N.Y.

Continuation of Ser. No. 216,991, Nov. 10, 1980, abandoned.
This application Mar. 30, 1983, Ser. No. 480,511
Claims priority, application Fed. Rep. of Germany, Mar. 15, 1979, 2910217
Int. Cl.³ A01G 9/02
U.S. Cl. 47—81 **9 Claims**



1. Apparatus for supplying a potted plant with air, and liquids including water and nutrients from a reservoir comprising:

a pot for holding the plant and including a base having a slotted opening in its periphery;

a holder unit for supporting the pot and having a tongue for insertion into the slotted opening, the tongue having a flat wick positioned thereon for watering and feeding the plant potted in the pot so that the wick may be inserted into the pot after the pot is filled with soil;

holder unit including level indicator means for showing the amount of liquid in the reservoir; and

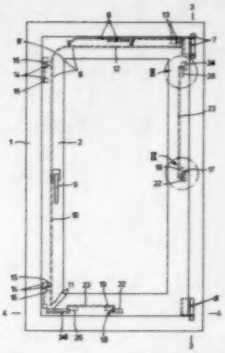
an adapter movably attached to the unit for varying the height of the pot with respect to the reservoir so that liquid can be added to the reservoir.

4,420,905

CLOSURE HARDWARE

Eckard Kucharczyk, Netphen, Fed. Rep. of Germany, assignor to Siegenia-Frank KG, Fed. Rep. of Germany

Filed Mar. 20, 1980, Ser. No. 132,073
Claims priority, application Fed. Rep. of Germany, May 21, 1979, 2920581
Int. Cl.³ E05B 65/06; E05C 19/02, 9/10, 1/12
U.S. Cl. 49—192 **10 Claims**



1. Latching mechanism for a planar closure which is hingedly mounted on a frame for swinging movement about one side of the frame between an open position and a closed position relative to the frame, said latching mechanism comprising:

(a) a control cam fixed to the hinge side of the frame,

(b) a catch fixed to the hinge side of the frame and spaced from the control cam,

(c) a driving rod slidably mounted for movement along its longitudinal axis within the plane of the closure on the hinge side of the closure,

(d) a dog mounted on one end of the driving rod for latchingly engaging the catch,

(e) biasing means operatively connected to the driving rod for urging the dog away from latching engagement with the catch, and

(f) a cam follower mechanism connected to the opposite end of the driving rod adjacent the control cam and engageable with the control cam when the closure moves from the open position to the closed position for moving the driving rod axially in opposition to said biasing means to position the dog for latching engagement with the catch and into latching engagement with the catch.

4,420,906

WINDOW REGULATOR

Joseph Pickles, Birmingham, Mich., assignor to Ferro Manufacturing Corporation, Southfield, Mich.

Filed Oct. 26, 1981, Ser. No. 314,668
Int. Cl.³ E05F 11/48
U.S. Cl. 49—352 **3 Claims**

1. Window regulating mechanism for a vehicle window glass which is moved generally vertically between open and closed position and is tilted during vertical movement about a substantially horizontal axis located adjacent the lower edge of the window and extending longitudinally of the vehicle in accordance with its vertical position, which comprises a generally upright guide post, a guide bracket slidable on said post, a floating bracket adapted to be fixed to the lower edge portion of the window and pivotally connected to said guide bracket by hinge means acting between said guide bracket and said floating bracket and having a pivot axis extending substantially horizontally and longitudinally of the vehicle and located

adjacent the lower edge of the window, means for moving said guide bracket longitudinally of said post comprising a functionally rigid guide track, an elongated flexible drive member slidably supported on said track, rotary drive means engaging said flexible drive member, said guide bracket being of horizontally elongated plate like configuration occupying a generally vertical plane, said guide bracket having laterally extending ears adjacent its upper and lower edges, said ears having openings therethrough slidably interfitting with said post, one of said ears having a second opening in the form of an open ended slot, said slot having an inner portion receiving and being movable along said track, the outer end of said slot receiving and being closed by an end portion of said flexible drive member, and means fixing the end portion of said flexible drive member to said guide bracket.

4,420,907

SHALLOW DOUBLE HUNG WINDOW

Charles A. Swan, Seminole, Fla., assignor to Windows, Inc., Largo, Fla.

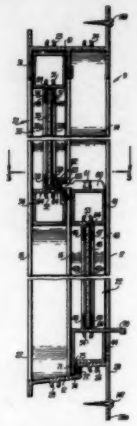
Continuation-in-part of Ser. No. 216,813, Dec. 16, 1980, abandoned, which is a continuation of Ser. No. 923,344, Jul. 10, 1978, Pat. No. 4,238,907, which is a continuation-in-part of Ser. No. 758,866, Jan. 12, 1977, abandoned. This application Dec. 18, 1980, Ser. No. 217,987

The portion of the term of this patent subsequent to Dec. 16, 1997, has been disclaimed.

Int. Cl.³ E05D *13/10*

U.S. Cl. 49—446 **7 Claims**

1. A pair of block and tackle sash balances in combination with a double hung window not greater than substantially two inches in over-all thickness, each balance comprising a rod having a U-shaped cross-section, a tension spring extending within said rod connected to one end thereof, a block and tackle mechanism within said rod connected to the other end of said spring, a cable of said block and tackle mechanism extending from the other end of said rod, the window comprising a jamb with a pair of inward grooves and a corresponding pair of outward grooves each defined by U-shaped sides provided side-by-side in said jamb, the outermost exterior facing said side of said jamp comprising a perimeter part having apertures for connective means therein which is coplanar and extends outwardly relative to the remainder of said jamb, a pair of window panels each with a stile having a U-shaped cross-section on one vertical side thereof, the legs of each said stile received in a corresponding said interior groove defining a longitudinal space having a substantially rectangular cross-section, each said stile defining an outwardly facing longitudinal groove at the outer end of each said leg thereof, a pile sealing strip received along the entire length of each said longitudinal groove, each said pile strip bearing against a corresponding side of an interior groove in said jamb whereby each said space is sealed, a said balance received in each said inward groove and having said cable affixed thereto whereby each said balance is urged upwardly, a headpiece attached to the top of each said stile, a stop member mounted on the top of each said rod, said stop member having an inclined surface adapted to cooperate with a mating inclined surface provided on said headpiece whereby the urging of said stop member against said headpiece urges said window panel in a lateral direction away from the corresponding said inward groove, said window being for installation on an existing framework of a porch or room wherein said framework consists essentially of beams having a thickness of substantially two inches.



4,420,908

BUFFING WHEEL

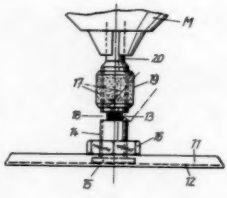
Reinhold Reiling, and Karl Reiling, both of Grundeltorstrasse 9, Kämfelbach-Ersingen, Fed. Rep. of Germany

Filed Oct. 15, 1981, Ser. No. 311,543

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1980, 3038850

Int. Cl.³ B24B *23/02*

U.S. Cl. 51—170 T **14 Claims**



1. In a buffing wheel comprising

a wheel body,

abrasive-containing flexible material secured to said wheel body, and

a drive shaft non-rotatably connected to said wheel body,

the improvement residing in that

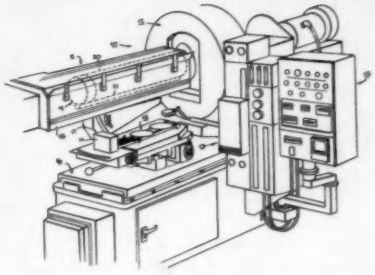
said drive shaft comprises a flexible portion and

a rigid member is mounted on said drive shaft and slidable relative thereto between an inoperative position, in which said drive shaft is flexible, and a stiffening position, in which said rigid member stiffens said drive shaft.

4,420,909
WAFERING SYSTEM

Robert E. Steere, Jr., Boonton, N.J., assignor to Silicon Technology Corporation, Oakland, N.J.

Filed Nov. 10, 1981, Ser. No. 320,097
Int. Cl.³ B24B 7/20
U.S. Cl. 51—73 R 26 Claims



1. A wafering system

a rotary cutting blade having a bore and a cutting edge about said bore for severing a wafer from a delivered ingot;

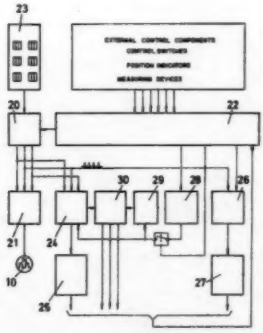
a chuck assembly on one side of said blade having a head for engaging a wafer severed from the ingot; and

means for moving said head between a rest position on said one side of said blade and a wafer holding position on an opposite side of said blade.

4,420,910
CONTROL DEVICE FOR A GRINDING MACHINE

Sture Larsson, Lidköping, Sweden, assignor to Lidkopings Mekaniska Verkstads AB, Lidkoping, Sweden

Continuation of Ser. No. 88,420, Oct. 26, 1979, abandoned, which is a continuation of Ser. No. 930,758, Aug. 23, 1978, abandoned. This application May 4, 1981, Ser. No. 260,376
Claims priority, application Sweden, Aug. 5, 1977, 7708912
Int. Cl.³ B24B 49/04
U.S. Cl. 51—165.88 4 Claims

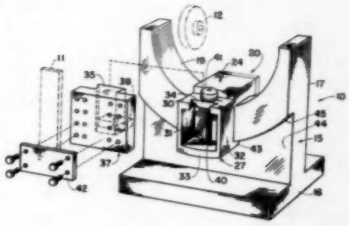


1. A device for controlling the feeding of a grinding wheel (2, 16) relative to a truing device (8, 19) for the grinding wheel at truing operations in a grinding machine incorporating a measuring apparatus (9) for indicating finished size of the ground surface of the workpiece (5, 12), means for controlling the feeding using the indications obtained, means for setting the operation cycle of the machine thus that truing of the grinding wheel is effected after a predetermined number of grinding operations by means of a truing device, which is mounted in a fixed position on the workhead and arranged in such a manner as to follow the movements of the workpiece during the grinding procedure, first members (24) for establishing the position of the grinding wheel spindle relative to the workpiece and the truing device and second members (26, 27) for controlling the feeding movement of the workpiece and of the truing device relative to the grinding wheel during the truing a specific distance, characterized thereby, that it incorporates a comparator (30), to which is connected said first member (24) and a memory (29) for establishing the initial position for the truing at each truing operation and a position index (28) for establishing the position of the grinding wheel spindle relative to the truing device after each truing operation in dependency of a settled position indication or a settled grinding time, when the desired finish size on the ground surface is indicated in the measuring apparatus (9) in a grinding cycle after the preceding truing operation, whereby the position of the position index (28) is fed into said first member (24) and into the memory (29) at each truing operation.

4,420,911
WORK PIECE HOLDER ASSEMBLY

Jan D. Michael, R.R. 1, Box 64, Solon, Iowa 52333

Filed Nov. 20, 1978, Ser. No. 961,990
Int. Cl.³ B24B 41/06
U.S. Cl. 51—216 R 2 Claims



1. A work piece holder assembly for moving a work piece along a selected annular path relative to a predetermined fixed position of a work tool, said assembly comprising:

(a) a base member that is stationary with respect to said work tool and has an arcuate shaped guide track means with an upper portion and a pair of side walls;

(b) a saddle member having a top portion ridable on the upper portion of said guide track means, and spaced side portions slidably engageable with said sidewalls of said track means to hold said saddle member against lateral movement;

(c) means for adjustably attaching the work piece to said saddle member in a predetermined relation with respect to said work tool and including:

1. a work piece mount slidably disposed on one side portion of said saddle member for vertical movement with respect thereto; and

2. a clamping member attachable to said work piece mount to releasably secure the work piece to said mount;

(d) means for precisely controlling the movement of said saddle member with respect to said work tool, said means including:

1. a gear sector associated with one of said sidewalls of said saddle member and engageable with said movement control means; and

2. gear means mounted on said base member and in meshing engagement with said gear sector.

4,420,912

APPARATUS FOR HOLDING WORKPIECES DURING HONING WORK

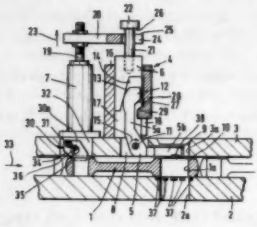
Heinz Gehring, Ostfildern, Fed. Rep. of Germany, assignor to Maschinenfabrik Gehring Gesellschaft mit beschränkter Haftung & Co. Kommanditgesellschaft, Ostfildern, Fed. Rep. of Germany

Filed Feb. 27, 1981, Ser. No. 239,119

Claims priority, application Fed. Rep. of Germany, Feb. 27, 1980, 3007261

Int. Cl.³ B24B *19/00*

U.S. Cl. 51—227 R **7 Claims**



1. An apparatus for holding at least one workpiece, such as a connecting rod, while honing a bore through the workpiece; wherein the workpiece has a first surface extending perpendicular to the axis of the bore and a second surface extending generally perpendicular to the first surface, the apparatus comprising:

at least one pair of first and second plates defining a space therebetween which space is wider than the thickness of the workpiece, the plates having a hole therethrough for receiving the honing tool, the workpiece resting against the first plate while being honed;

holding means for each pair of plates for holding the workpiece against the first plate while allowing the workpiece to slide on the first plate, the holding means comprising:

at least one rigid member mounted on the second plate for movement toward the first plate, the rigid member having at least one first surface for abutting only the first surface of the workpiece; while the workpiece is between the first and second plates and is being honed, the rigid member having a second surface thereon in juxtaposition with an opposed surface on one of the plates;

wedge means mounted on one of the plates, and

means for inserting the wedge means between the second surface on the rigid member and the opposed surface on one of the plates once the first surface on the rigid member engages the first surface of the workpiece to lock the rigid member in place; whereby movement of the workpiece away from the first plate is precluded while sliding movement of the workpiece is allowed during honing, and

means engaging one side of the workpiece along the second surface thereof to prevent rotation of the workpiece during honing.

4,420,913

ROOF RIDGE STRUCTURE AND SYSTEM

Gene M. Long, Houston, Tex.; Terry E. DeWitt, Memphis, and John R. Bell, III, Germantown, both of Tenn., assignors to AMCA International

Filed Jul. 20, 1981, Ser. No. 284,970

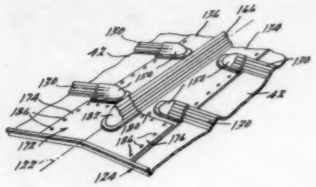
Int. Cl.³ E04B *7/00*

U.S. Cl. 52—57 **11 Claims**

1. A roof ridge system for enclosing the ridge of a building roof, said building roof having at least two surfaces covered with raised rib seam roofing panels whereby said raised rib seams may be of non-uniform height and spacing, said ridge system comprising:

a first ridge panel section connected to one of the roof surfaces and having a plurality of notches corresponding to the raised rib seams along said surface,

a second ridge panel section connected to another of the roof surfaces and having a plurality of notches corresponding to the raised rib seams along said surface,



said first and second ridge panel sections being interlocked together to form a raised rib seam substantially along the ridge line of said roof, and

a plurality of cap means positioned on said first and second ridge panel sections, each of said cap means covering one of said notches and an end of said raised rib seams of said roofing panels.

4,420,914

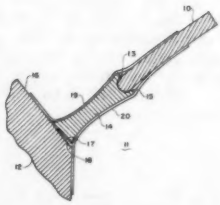
SPHERICAL SEGMENT EDGE ATTACHMENT

W. Wayne Williams, Westwood, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 23, 1981, Ser. No. 324,342

Int. Cl.³ E04F *15/14*

U.S. Cl. 52—80 **3 Claims**



1. An edge attachment for supporting on an annular supporting surface a spherical shell segment, which comprises:

a. a generally frustoconical member having on its inner edge an annular groove for receiving the peripheral edge of said shell segment;

b. said member having a generally rounded peripheral edge including means for rolling engagement with said supporting surface, said means comprising a plurality of concentric annular corrugations on the peripheral edge of said member and a plurality of mating corrugations on said support surface.

4,420,915

LARGE-PANEL CONCRETE WALL BEARING COMPONENTS

Boris Netupsky, Vancouver, Canada, assignor to Dyform Engineering Ltd., Canada

Filed Apr. 14, 1980, Ser. No. 140,370

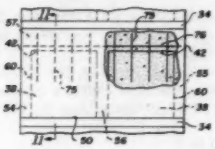
Claims priority, application Canada, Apr. 18, 1979, 325689

Int. Cl.³ E04B *1/92*

U.S. Cl. 52—98 **13 Claims**

1. A large-panel concrete wall bearing component compris-

ing a large concrete bearing panel to rest on a lower edge thereof on a support and to carry a load on an upper edge, said panel having at least one thin weakness band extending cross-sectionally between opposite faces of the bearing panel, said thin band comprising a plastic strip completely embedded in the concrete of the panel and having edges near but spaced



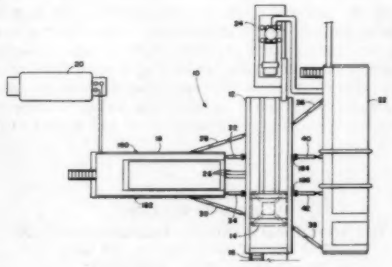
inwardly from the panel faces and defining a portion of said bearing panel as a failure section, said thin band being weaker than the concrete of the bearing panel, and said failure section being of such size as to blow out of the panel along the weakness band when subjected to a blast while leaving enough of the bearing to continue to support said load.

4,420,916

METHOD AND APPARATUS FOR ALIGNING AND SECURING AUXILIARY EQUIPMENT WITH RESPECT TO A WELL DRILLING PLATFORM

William H. Ricketts, Muskogee, Okla., assignor to Muskogee Environmental Conservation Co., Muskogee, Okla.

Filed Nov. 20, 1981, Ser. No. 323,291
Int. Cl.³ B65G 7/00; E21B 7/02
U.S. Cl. 52—122.1 **19 Claims**



18. A method for aligning and securing an auxiliary structure to a well drilling platform comprising the steps of

positioning the auxiliary structure near its desired position with respect to the drilling platform;

connecting a base portion of the drilling platform to a base portion of the auxiliary structure with a pair of spaced-apart non-parallel hydraulic jacks;

hydraulically adjusting the length of said jacks to position the base portion of the auxiliary structure with respect to the base portion of the drilling platform;

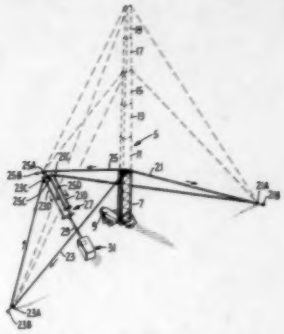
further connecting the base portions of the auxiliary structure to the drilling platform with a pair of spaced parallel pivotal connecting links of fixed length.

4,420,917

GUYLINE TENSION DEVICE FOR COMMUNICATION TOWERS

Conrad A. Parlanti, 7182 Rasmussen Ave., Visalia, Calif. 93277

Filed Dec. 28, 1981, Ser. No. 334,983
Int. Cl.³ E04H 12/34
U.S. Cl. 52—123.1 **6 Claims**



1. A cabling system for raising and lowering a nesting tower structure comprising:

at least three ground anchors set out from and peripherally around a nesting tower structure; at least one pulley secured to each of said ground anchors; a like number of cables, one end of each cable being secured to the tower structure and trained around one of said pulleys; and means for tensioning said cables and maintaining a preselected tension on said cables as said tower structure is raised or lowered, said means for equalizing the tension in each of said cables comprising a pair of first class levers, one lever connected at a center fulcrum point to a pivot on the other, the tension forces of two cables being applied equal distances from and on opposite sides of said fulcrum point, the pivotal connection to said second lever acting with a moment arm relative to the fulcrum point on said second lever to balance the tensioning force of a third cable connected to a second pivot point on said second lever and having a fourth cable attached to the fulcrum point of said second lever whereby tension on said fourth cable will be applied equally to the first three cables.

4,420,918

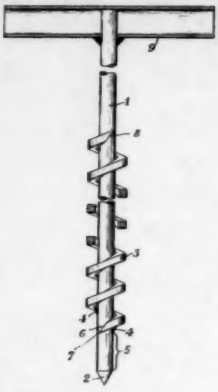
STAKE NOTABLY FOR MEASURING THE ELECTRICAL RESISTANCES OF GROUND CONNECTIONS

Daniel Arnoux, St Germain en Laye; Andre Leconte, Le Vezinet; Claude Genter, Paris, and Bernard Michel, Conflans St Honorine, all of France, assignors to Societe en Commandite par actions dite: Chauvin Arnoux, Paris, France

Filed Oct. 19, 1981, Ser. No. 312,892
Claims priority, application France, Oct. 24, 1980, 80 22782
Int. Cl.³ E02D 5/74
U.S. Cl. 52—157 **7 Claims**

1. In a ground stake comprising a smooth cylindrical metal rod, which has a point at its lower end and to which is welded a helical screw thread, the improvement consisting in that the screw thread is formed by a helical spring made of a wire having a polygonal cross-section, which surrounds the rod at a

short radial distance therefrom and which is welded to the rod at a limited number of points, so that a substantial part of the



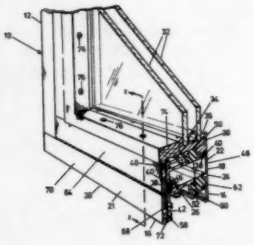
spring is free to move resiliently with respect to the rod while being guided thereby.

4,420,919

WALL OPENING FRAME MEMBER

Ronald J. Weber, Wausau, Wis., assignor to Wausau Metals Corporation, Wausau, Wis.

Filed Aug. 17, 1981, Ser. No. 293,168
Int. Cl.³ E06B 1/04
U.S. Cl. 52—204 **5 Claims**



1. A wall opening frame member (10, 79) for framing doors, windows, and the like, comprising:

(a) a metal frame (18) having an exterior side (14) and an interior side (16) with interior surfaces (66, 72, 82);

(b) a wood facing (20) adapted to cover all substantial interior surfaces (66, 72, 82) of the metal frame (18) when the metal frame (18) is in use; and

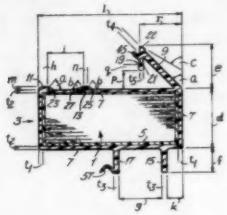
(c) means for attaching the wood facing (20) to the interior surfaces (66, 72, 82) so that no substantial surface of the metal frame (18) is exposed to the inside ambient air and no continuous metallic heat transfer path exists between the exterior side (14) and the inside ambient air uninterrupted by the wood facing (20), including an insulating foam body (68) with an adhesive on each side of the body, the adhesive sides respectively attached to the wood facing (20) and the metal frame (18) so that heat transfer between the exterior and interior sides (14 and 16) is further reduced by the insulating foam body, the foam body being selected to be sufficiently elastic and deformable that thermal dimensional changes in the wood facing (20) and metal frame (18) are insufficient to disengage those parts from the foam body.

4,420,920

CORED PLASTICS PROFILES AND MANUFACTURE OF FRAMES FOR WINDOWS AND THE LIKE THEREFROM

Michael J. Hewitt, 5 Hayling Crescent, Leicester, England (LE5 ORH)

PCT No. PCT/GB80/00133, § 371 Date Apr. 29, 1981, § 102(e) Date Apr. 9, 1981, PCT Pub. No. WO81/00588, PCT Pub. Date Mar. 5, 1981
PCT Filed Aug. 29, 1980, Ser. No. 253,502
Claims priority, application United Kingdom, Aug. 29, 1979, 7929902; Jan. 11, 1980, 8000926; Jun. 24, 1980, 8018338
Int. Cl.³ E04C 1/00
U.S. Cl. 52—309.15 **11 Claims**



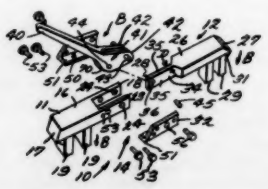
1. A cored extruded plastics profile suitable for use in the manufacture of frames for panels including wndows and comprising a core of shape-retaining material and a cladding of plastics material extruded therearound, characterized in that the core (1) is of generally rectangular cross sectional shape and in that the cladding (3) provides (a) along one surface of the profile at a locality adjacent one edge of said surface a retaining member (9) for a panel, which retaining member (9) extends inwardly over said surface and is inclined at an angle thereto and (b) along said surface of the profile, at a locality spaced from the retaining member, a rib (11) having an undercut face (23) inclined to said surface at an angle at least substantially corresponding to the angle of inclination of the retaining member (9), the retaining member (9) being severable from the profile to form the profile into an outer frame (42) and being utilized as glazing strips (9') in the manufacture of a corresponding inner frame (40), the glazing strips (9') being arranged, after the insertion of a panel, to abut against the undercut face (23) of the rib (11) of the profile and to be supported by supporting members (47) mounted on said surface of the profile.

4,420,921

BUILDING SPACER

Isaac H. Hardin, General Delivery, Lexington, Ind. 47138

Filed Apr. 12, 1982, Ser. No. 367,741
Int. Cl.² E04F 21/00; B43I 13/00
U.S. Cl. 52—749 **10 Claims**



1. A tool for holding and spacing structural members, comprising:

a first jaw assembly including a linear body portion elongated in a predetermined dimension and a pair of stationary first jaws spaced from each other a fixed predetermined distance and extending parallel to each other in the same direction from a first end of said body portion, said direction substantially perpendicular to said dimension of elongation;

a second jaw assembly including a linear body portion elongated in a predetermined dimension and a pair of stationary second jaws spaced from each other a fixed predetermined distance and extending parallel to each other in the same direction from a first end of said body portion, said direction substantially perpendicular to said dimension of elongation;

a locking lever comprising a handle and a body;

cooperating surface means formed on second ends of said jaw assemblies, opposite said first ends, for providing overlap between said first and second jaw assembly body portions in the dimension of elongation thereof; and

means for pivotally mounting said locking lever body to said first and second jaw assemblies body portions at spaced points adjacent the second ends thereof, so that the jaw assemblies are movable from a first, locked, substantially in-line position, with said locking lever body therebetween and said handle extending outwardly with said first and second jaws spaced from each other a fixed predetermined distance; to a second, unlocked, position wherein said jaw assemblies do not overlap and said jaw assembly body portions are not in-line, and said first and second jaws are not spaced a fixed, predetermined position from each other.

4,420,922

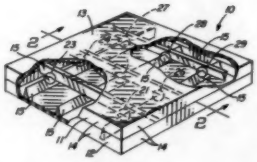
STRUCTURAL SECTION FOR CONTAINING A VACUUM

Pryce Wilson, 2202 N. 38th St., Phoenix, Ariz. 85008

Filed Dec. 18, 1980, Ser. No. 217,770

Int. Cl.³ E04C *2/34*

U.S. Cl. 52—791 **7 Claims**



1. A structural section comprising:

a pair of engaging parts, each having a confronting edge which together form walls for encompassing and sealing a space therebetween containing less than surrounding atmospheric pressure,

means for positioning said parts, one relative to the other, comprising at least a pair of spacer members,

each one of said members of said pair of spacer members extending into the interior of said space from a different one of said parts for engaging the other one of said spacer elements laterally thereof at least at point contacts along a line,

said spacer members comprising elongated triangular configurations with each member having its base secured to the interior of a different one of said parts,

each of said spacer members engaging the other laterally thereof at its apex,

one of said engaging spacer members being notched for positioning the engaging members relative to each other, and

the angle defined by the notch being greater than the angle defined by the converging sides forming the apex of engaging spacer members.

4,420,923

METHOD AND APPARATUS FOR COMBINED GUIDANCE, INCORPORATING A REGISTER, OF TWO CONTINUOUSLY ADVANCED FOIL STRIPS

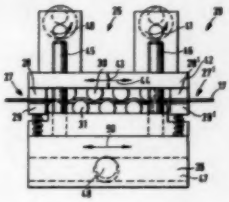
Theo Moser, Steinenberg, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Oct. 21, 1981, Ser. No. 313,513

Claims priority, application Fed. Rep. of Germany, Oct. 21, 1980, 3039616

Int. Cl.³ B65B *41/18, 57/04*

U.S. Cl. 53—51 **6 Claims**



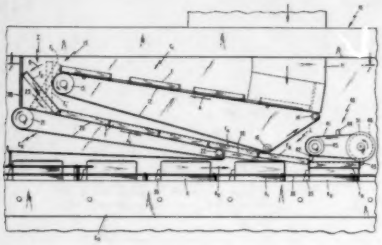
1. An apparatus for producing a unitized strip containing preformed package units, each of said units bearing a complete legend thereon, comprising a supply source for a first strip of deformable material, means for advancing a leading edge of said first strip of deformable material to a heating station, means for conveying said first heated strip to a molding means, said molding means arranged to produce recesses in said first heated strip, means for advancing said first strip to a filling station, means associated with said filling station to control filling said recesses; means for advancing said first strip to a sealing station, a supply source for a second strip of deformable material, means for advancing a leading edge of said second strip of deformable material to a stretching station, clamping means in said stretching station adapted to clamp a portion of said second strip of deformable material, distention means arranged to cooperate with said clamping means to selectively stretch said second strip of deformable material, means for advancing said second strip to a scanning station, said stretching station including an oscillating lifting press system ahead of said scanning station and said second strip has a predeterminate feed rate, said system being adapted to said feed rate; said clamping means comprises first and second pairs of aligned clamping devices associated with the oscillating lifting press system and said pairs of aligned clamping devices are separated by a distance from center to center equal to a circumferential path of the oscillating lifting press system; means in said scanning station for sensing markings applied to said second strip of deformable material, means associated with said scanning station for actuating said clamping means and said distention means in response to relative positions of said markings, means for advancing said second strip of deformable material to said sealing station, means in said sealing station for sealing said strips into said unitized strip, means for advancing said unitized strip to a perforating and punching station, means in said perforating and punching station for severing said package units from said unitized strip and thereafter discharging said package units from the apparatus, whereby each package unit bears a complete legend thereon.

4,420,924

APPARATUS AND METHOD FOR INVERTING AND APPLYING FLANGED LIDS TO ERECTED CARTONS

S. Johannes Hoyrup, Monta Vista, and Karl A. Krause, Mokelume Hill, both of Calif., assignors to Kliklok Corporation, Greenwich, Conn.

Filed Sep. 1, 1981, Ser. No. 298,607
Int. Cl.³ B65B *7/28*
U.S. Cl. 53—307 **4 Claims**



1. Apparatus for inverting and applying flanged lids to cartons, comprising:

(a) upper conveying means defining an upper feed path extending in a first direction for receiving and conveying inverted lids;

(b) lower conveying means defining a lower feed path moving in a second direction, said lower conveying means positioned beneath the upper conveying means for receiving the lids from said upper conveying means, said upper and lower feed path being spaced apart from each other;

(c) inverting means for said flange lids to provide upright lid position during the transition from the upper to the lower feed path;

(d) transfer means receiving and supporting the lids being discharged from the lower conveying means and presenting the lids to a lidding station;

(e) carton conveyor means intersecting said lower feed path adjacent said transfer means at said lidding station;

(f) means positioned downstream of the lid transfer means for applying the lid to the carton;

(g) an endless member having a plurality of lugs, a first lug being positioned at said lidding station to initially align and engage the leading edge of the lids with the corresponding moving cartons, said endlesss member and said lugs having idler movement in the direction of carton travel to said lids;

(h) means for braking said idler movement for engaging said lids to firmly engage said lug and allow the lids to be securely applied;

(i) a second in-line lug contacting the lids adjacent the trailing edge for seating engagement on the cartons.

4,420,925

MULTI-BLADE LAWNMOWER ATTACHMENT

Kenneth Webster, Odin, Ill., assignor to Branson, Jones & Branson, Centralia, Ill.

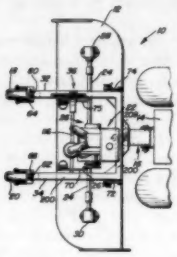
Filed Feb. 25, 1981, Ser. No. 238,352
Int. Cl.³ A01D *35/12*
U.S. Cl. 56—15.9 **3 Claims**

1. A lawnmower assembly comprising in combination:

a pulling unit having a first lawnmower blade assembly operably associated therewith, said first lawnmower blade assembly serving to cut a first swath of a predetermined width through grass and the like;

a towed unit having a second lawnmower blade assembly operably associated therewith, said second lawnmower blade assembly being positionable relative to said pulling unit in a manner whereby at least one second swath of a predetermined width is cut through said grass and the like concurrently with cutting of said first swath; and

hitch means connecting said towed unit to said pulling unit, wheel means providing support for the towed unit, said hitch means including a first pivot bolt means extending parallel to the longitudinal horizontal direction of movement of the lawnmower assembly and enabling relative pivotal movement between the towed unit and pulling unit only about a longitudinal axis parallel to the longitudinal direction of the towed and pulling units, and a second pivot bolt means extending perpendicular to the first pivot bolt means and transverse to the longitudinal horizontal



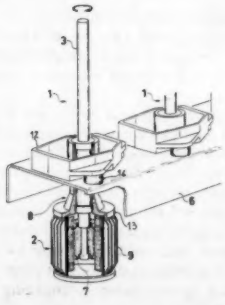
direction of movement of the lawnmower assembly and enabling relative pivotal movement between the towed unit and pulling unit only about a transverse axis perpendicular to the longitudinal direction of movement of the towed and pulling units thereby enabling the towed unit to follow the contour of the supporting surface engaged by the wheel means by permitting relative pivotal movement between the units about a longitudinal horizontal axis and a transverse horizontal axis and preventing relative movement of the units about a vertical axis to prevent jackknifing of said towed unit with respect to said pulling unit when said lawnmower assembly moves in a reverse direction.

4,420,926

TWISTING SPINDLE DRIVEN BY AN INDIVIDUAL ELECTRIC MOTOR

Jean Remontet, Loire, France, assignor to ASA S.A., France

Filed Jun. 21, 1982, Ser. No. 390,703
Claims priority, application France, Jun. 29, 1981, 81 12918
Int. Cl.³ D01H *1/244, 7/08*
U.S. Cl. 57—100 **4 Claims**



1. A twisting spindle driven by an individual electric motor, the spindle comprising:

a spindle barrel mounted on a support frame by means permitting free rotation of the barrel;

a motor having a rotor which is rigidly connected to the spindle barrel, with the rotor or stator of the motor rigidly connected to the support frame by a sleeve extending therethrough and surrounding the barrel of the spindle;

the sleeve having an upper collar elastically fastened to the support frame and a lower collar rigidly connected to the body or stator of the motor, with anti-friction bearings contained within the sleeve.

4,420,927

PROCESS FOR THE MANUFACTURE OF A FANCY YARN

Pierre Payen, 53, rue Chaziere, 69004 Lyons, France

Filed Oct. 14, 1981, Ser. No. 311,404
Claims priority, application France, Oct. 14, 1980, 80 22186
Int. Cl.³ D02G *1/02*
U.S. Cl. 57—288 **3 Claims**

1. A process for manufacturing fancy yarns having a crepe effect, comprising:

(a) first overtwisting a multifilamentary partially oriented synthetic yarn, and

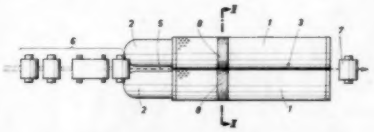
(b) then simultaneously false twist texturing and complementary stretching the overtwisted multifilamentary partially oriented synthetic yarn, said false twist texturing being carried out in the same twist direction as said overtwisting.

4,420,928

APPARATUS FOR MANUFACTURING A YARN

Ernst Fehrer, Auf der Gugl 28, A-4020 Linz, Austria

Filed Jan. 21, 1982, Ser. No. 341,294
Claims priority, application Austria, Feb. 9, 1981, 560/81
Int. Cl.³ D01H *1/12, 7/882*
U.S. Cl. 57—401 **7 Claims**



1. In apparatus for manufacturing a yarn, comprising two juxtaposed, closely spaced apart suction drums defining a generally triangular space therebetween and adapted to be rotated in the same sense, the drums having confronting suction zones,

a drawing frame disposed near one end of said suction drums and operable to deliver a roving into said triangular space, said suction zones being operable to produce in said triangular space a suction flow tending to pull said roving in said triangular space into contact with said suction drums so that said suction drums, when rotated in the same sense, will twist said roving to form a yarn, and

withdrawing means disposed near the other end of said suction drums and operable to withdraw said yarn from said triangular space,

the improvement of peripherally extending, confronting annular roughening zones on said suction drums, said roughening zones being axially spaced from said other end of said suction drums and being adapted to pull the ends of fibers of said roving out of said roving and to wind the fibers around said roving in said triangular space, and

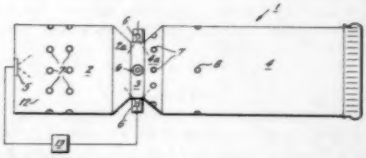
said suction zones extending between said annular roughening zones and said other end of said suction drums.

4,420,929

DUAL STAGE-DUAL MODE LOW EMISSION GAS TURBINE COMBUSTION SYSTEM

Robert A. Jorgensen, Clifton Park; Roger A. Farrell, Schenectady, and Bruce W. Gerhold, Rexford, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 3,016, Jan. 12, 1979, abandoned. This application Oct. 6, 1980, Ser. No. 194,285
Int. Cl.³ F23R *3/30, 3/34*
U.S. Cl. 60—39.06 **6 Claims**



1. A method of operating gas turbine combustor to produce low NO_x emission, said combustor having first and second combustion chambers interconnected by a throat chamber, said first chamber having first fuel introduction means and at least one of said throat chamber and said second chamber having second fuel introduction means, comprising in sequence,

(a) continuously introducing fuel into said first chamber through said first fuel introduction means and causing said fuel to burn therein;

(b) commencing the introduction of fuel to said second chamber through said second fuel introduction means and increasing the rate of introduction thereof until the rate of fuel introduction through all of said fuel introduction means is about the desired fuel introduction rate, ignition of the fuel in said second chamber being commenced as a result of passage of combustion products from said first chamber to aid second chamber;

(c) decreasing the rate of fuel introduction through said first fuel introduction means and correspondingly increasing the rate of introduction through said second fuel introduction means such that the overall rate of introduction remains substantially constant until at least the burning of fuel in said first chamber ceases; and

(d) increasing the rate of fuel introduction through said first fuel introduction means and correspondingly decreasing the rate of introduction through said second fuel introduction means such that the overall rate of introduction remains substantially constant until the desired level of NO_x emission from the combustor is realized.

4,420,930

PROCESS FOR OPERATING A FURNACE OR A COMBUSTION ENGINE

Harold Beuther, Cheswick, and Johan G. Schulz, Pittsburgh, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 46,442, Jun. 7, 1979, Pat. No. 4,278,443. This application Feb. 9, 1981, Ser. No. 232,997
Int. Cl.³ F02C *3/20*
U.S. Cl. 60—39.461 27 Claims

1. Process for operating a furnace or a combustion engine which comprises burning in said furnace or said combustion engine a mixture of polycyclic, polycarboxylic acids obtained by oxidizing coal with aqueous nitric acid, separating from the resulting product an aqueous phase and a solid phase and then extracting the solid phase with a solvent to recover said mixture.

18. The process of claim 1 wherein said burning is effected in a turbine.

4,420,931

METHOD OF GENERATING COMBUSTION GASES UTILIZING POLYNORBORENE-BASED COMBUSTIBLE COMPOSITIONS

William S. Anderson, Sunnyvale, Calif., assignor to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 121,344, Feb. 14, 1980. This application Jun. 4, 1982, Ser. No. 385,216
Int. Cl.³ C06D *5/00*
U.S. Cl. 60—219 16 Claims

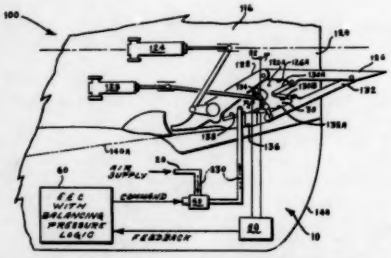
1. A method of generating combustion gases which comprises burning a composition of matter comprising polynorbornene having a liquid fuel material having a heat of combustion above about 9300 Kcal/cc dispersed uniformly therethrough, said composition having a heat of combustion of least 9300 Kcal/cc.

4,420,932

PRESSURE CONTROL SYSTEM FOR CONVERGENT-DIVERGENT EXHAUST NOZZLE

Juan A. Mendez, Miami, and John L. Mayers, Lake Park, both of Fla., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 2, 1982, Ser. No. 353,984
Int. Cl.³ F02K *1/18*
U.S. Cl. 60—230 1 Claim



1. A pressure control system for a rectangular convergent-divergent exhaust nozzle of a jet aircraft turbofan engine having exhaust nozzle flaps located within the main exhaust flow, said system comprising:

a. means for providing a cavity located in said exhaust nozzle adjacent one side of said exhaust nozzle flaps, wherein said means includes and said cavity is defined by constituent convergent flaps of said exhaust nozzle flaps, by a forward end of constituent divergent flaps, by constituent sealing flaps of said exhaust nozzle flaps, by a forward end of constituent external flaps of said exhaust nozzle flaps, wherein said sealing flaps interlink said divergent flaps and said external flaps, by a cross-beam-to-convergent flaps seal of said exhaust nozzle flaps, and by a side wall of said rectangular convergent-divergent exhaust nozzle; and

b. means, operably connected to said cavity, for controlling pressure within said cavity in relationship to induced loads applied to the other side of said nozzle flaps by said main exhaust flow during operation of said jet aircraft turbofan engine, wherein this pressure control means includes:

(1) means, operably connected to said cavity, for conveying air into said cavity;

(2) means, operably connected to said cavity and to said main exhaust flow, for sensing pressure difference between said pressure in said cavity acting on said one side of said nozzle flaps and pressure applied to said other side of said nozzle flaps by said main exhaust flow and for providing a signal in response thereto, wherein this pressure difference sensing and signalling means includes: an air pressure sensor in said cavity; another air pressure sensor in said main exhaust flow; and, a differential air pressure sensor connected to said air pressure sensor in said cavity and to said other air pressure sensor in said main exhaust flow;

(3) means, operably connected to said air conveying means and to said cavity at a location therebetween, for controlling the pressure of air entering said cavity in response to said signal, wherein this entering air pressure control means includes a pressure control valve; and

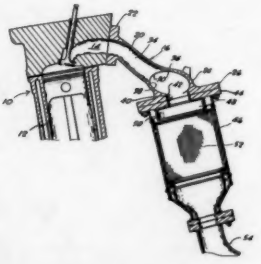
(4) means, operably connected to said pressure control valve and to said differential air pressure sensor, for maintaining a predetermined difference between the pressure of the air in said cavity and the pressure of the air in the main exhaust flow, wherein this means includes an electronic engine control with balancing pressure logic.

4,420,933

EXHAUST SYSTEM

Ikuo Kajitani, Hanno; Tadayoshi Hayashi, Fujimi; Sakuji Arai, Saitama, and Yutaka Hirayama, Kawagoe, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 26, 1982, Ser. No. 382,292
Claims priority, application Japan, Jun. 12, 1981, 56-85555[U]
Int. Cl.³ F01N *3/28, 7/06*
U.S. Cl. 60—302 10 Claims



1. An exhaust system in a multicylinder engine, having a plurality of elongate exhaust passages in communication with respectively cylinders in the multicylinder engine, a manifold chamber in communication with said elongate exhaust passages and a catalyst in communication with said manifold chamber, wherein the improvement comprises a common wall between two adjacent exhaust passages of said plurality of elongate exhaust passages, said manifold chamber having an

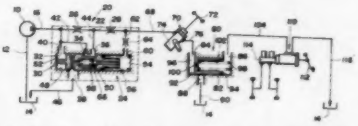
inner oblately spheroidal surface, and a restricted outlet from said manifold chamber in communication with said catalyst.

4,420,934

AUTOMOTIVE VEHICLE HYDRAULIC SYSTEM

Jun Udono, Higashiyamato, Japan, assignor to Nissan Motor Company, Ltd., Yokohama, Japan

Filed Jan. 29, 1980, Ser. No. 116,639
Claims priority, application Japan, Jan. 30, 1979, 54-8674
Int. Cl.³ F15B *11/20*; G05D *11/02*
U.S. Cl. 60—422 11 Claims



1. A hydraulic system for use in an automotive vehicle including an internal combustion engine, comprising:

(a) an engine driven pump adapted to discharge hydraulic fluid in amounts directly proportional to the operating speed of said engine;

(b) a first hydraulic unit including a first fluid flow control means and a first open-center type hydraulic control valve included in a power steering unit, said first fluid flow control means being arranged to receive fluid supplied thereto in varying amounts and to discharge to said first open-center type hydraulic control valve fluid at a first predetermined flow rate in response to the receipt of fluid at a low flow rate and to discharge to said first open-center type control valve fluid at a second predetermined flow rate smaller than said first predetermined flow rate in response to the receipt of fluid at a high flow rate; and

(c) a second hydraulic unit including a second fluid flow control means and a second open-center type hydraulic control valve, said second fluid flow control means being arranged to receive fluid supplied thereto at varying flow rates and, regardless of said received varying flow rates, to discharge fluid at a constant flow rate to said second open-center type hydraulic control valve;

(d) said engine driven pump, said first hydraulic unit and said second hydraulic unit being connected in series with each other.

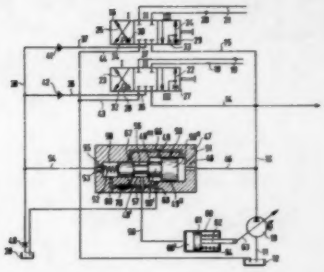
4,420,935

HYDRAULIC SYSTEM

Walter Kobald, Schwieberdingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Feb. 22, 1980, Ser. No. 123,791
Claims priority, application Fed. Rep. of Germany, Mar. 17, 1979, 2910611
Int. Cl.³ F15B *13/08*
U.S. Cl. 60—427 2 Claims

1. In a hydraulic system having an adjustable pump, a plurality of multiway control valves each having inlet and outlet ports and shiftable control passages, conduits for delivering pressure fluid from said pump via said control valves to a plurality of loads, means for adjusting the flow of the pressure fluid to the working conditions of said loads, the adjusting means including measuring throttles provided respectively in the passages of said multiway control valves which are assigned to high pressure conduits for said loads, an additional passage provided in each of the multiway control valves and being connected to the outlet of the assigned measuring throttle, a regulating flow return conduit connected to respective multiway control valves to communicate with the additional passage when the control valves are switched-over into a working position; an additional throttle provided in the outlet end of the regulating return conduit, flow regulating means controlled by the pressure difference between the outlet of the pump and the pressure in the regulating return conduit, and a hydraulically controlled actuator connected to the outlet of the pump via the flow regulating means and being mechanically coupled to the pump to adjust the discharge of the latter in response to the working conditions of the load, an arrangement of said flow regulating means comprising a flow regulating valve having a housing and, within the housing, a stepped differential piston defining a first part of a larger diameter and a second part of a smaller diameter; a first pressure space adjoining the end face of the first piston part and being connected to the pressure conduit at the outlet of said pump; a second pressure space adjoining the second piston part and being connected to said regulating return conduit; an adjusting spring arranged in said second pressure space to bias said differential piston toward said first pressure space; a first annular groove formed in said second piston part; a control port formed in said housing in the range of said annular groove; a second annular groove formed in said housing between the end face of the second piston part and said first annular groove; a bypass conduit connecting said first pressure space to said second annular groove; and said control port being connected to said actuator.

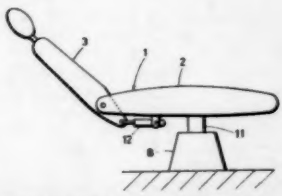


4,420,936

DRIVE CONTROL CIRCUIT FOR DENTAL TREATMENT TABLE

Takahiro Matsui, Uji, Japan, assignor to Kabushiki Kaisha Morita Seisakusho, Kyoto, Japan

Filed Mar. 31, 1981, Ser. No. 249,385
Claims priority, application Japan, Jun. 18, 1980, 55-85339[U]
Int. Cl.³ F16D *31/02*
U.S. Cl. 60—431 6 Claims



1. A drive control circuit for a dental treatment table with a hydraulic cylinder for elevating and lowering a seat, comprising:

a hydraulic drive circuit equipped with a hydraulic pump, a first hydraulic valve for supplying hydraulic fluid to said cylinder, and a second hydraulic valve for exhausting hydraulic fluid from said hydraulic cylinder, and

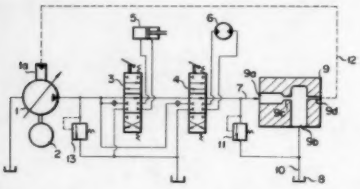
a hydraulic pump operation circuit equipped with an air switch for turning on said hydraulic pump when said air switch is operated, a first air valve for operating said air

switch and said first hydraulic valve, and a second air valve for controlling said second hydraulic valve.

4,420,937
HYDRAULIC CIRCUIT FOR A VARIABLE DISPLACEMENT PUMP

Toshikiro Naruse, Kawasaki; Kazuo Uehara, Tokyo, and Hideaki Saito, Fujisawa, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Jul. 24, 1981, Ser. No. 286,535
Claims priority, application Japan, Jul. 28, 1980, 55-105608[U]
Int. Cl.³ F16H *39/46*
U.S. Cl. 60—450 **4 Claims**



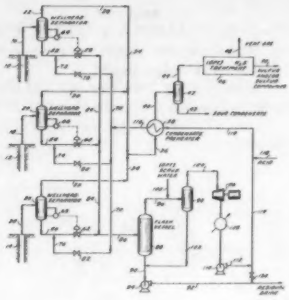
1. A hydraulic circuit for controlling displacement of a variable displacement pump including a servo mechanism connected thereto for controlling the same, comprising:
an actuator driven by said variable displacement pump;
a control valve disposed between said variable displacement pump and said actuator for controlling the latter; and
means for converting static pressure of a fluid into a dynamic pressure thereof, said means being disposed in a circuit for connecting a system pressure line of the hydraulic circuit to a reservoir when said control valve occupies its neutral position and comprising a body having formed therein an inlet port connected to the system pressure line and an outlet port connected to the reservoir, said body also having formed therein a nozzle provided between said inlet and outlet ports for producing a jet flow of the fluid and a dynamic pressure sensing means operatively connected to the servo mechanism for said variable displacement pump.

4,420,938
GEOTHERMAL POWER PLANT

William C. Lieffers, Fullerton, Calif., assignor to Union Oil Company of California, Brea, Calif.

Continuation of Ser. No. 173,995, Jul. 31, 1980, which is a continuation-in-part of Ser. No. 953,644, Oct. 23, 1978, Pat. No. 4,244,190. This application Jun. 29, 1982, Ser. No. 393,460
Int. Cl.³ F03G *7/00*
U.S. Cl. 60—641.5 **9 Claims**

1. A process for treating and deriving useful energy from a hot geothermal brine having a tendency to deposit amorphous silica and/or calcite upon a reduction in the temperature or pressure of said brine, which process comprises the steps of:
(a) mixing said hot geothermal brine with an acidified preheated steam condensate so as to form a hot aqueous mixture having a reduced tendency for depositing amorphous silica and/or calcite;
(b) reducing the pressure of the hot aqueous mixture from step (a) so as to flash a portion thereof, thereby forming high quality steam and residual brine;
(c) deriving useful energy from said high quality steam and condensing said steam to form steam condensate;
(d) pressurizing at least a portion of the steam condensate from step (c), and preheating and acidifying the pressurized portion, thereby forming acidified preheated steam condensate; and
(e) recycling the acidified preheated steam condensate from step (d) for mixture with said hot geothermal brine in step (a),

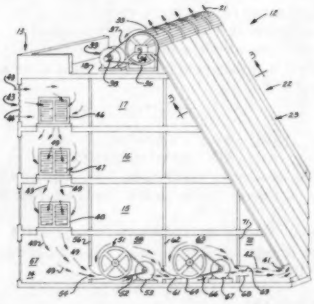


whereby the mixing of said acidified preheated steam condensate with said hot geothermal brine in step (a) substantially inhibits the deposition of amorphous silica and/or calcite during step (b).

4,420,939
SOLAR BUILDING CONSTRUCTION

James H. McCue, P.O. Box 189, Columbia, Calif. 95310

Filed Jul. 16, 1982, Ser. No. 399,050
Int. Cl.³ F03G *7/02*
U.S. Cl. 60—641.12 **10 Claims**

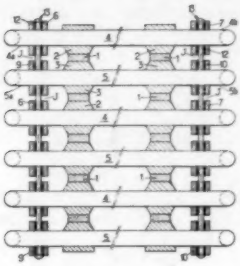


1. A solar building construction comprising:
a. a structure having a floor, roof and side walls extending between said floor and said roof to enclose a substantially air tight space except for an elevated air inlet opening adjacent said roof and an air outlet opening adjacent said floor;
b. a solar collector including a plurality of elongated open-ended vertically inclined air ducts, the bottom of said ducts being in communication with said outlet opening;
c. a first air turbine generator in communication with the top of said ducts for rotation by the ascending solar heated air emerging from said ducts; and,
d. means for conducting relatively cool air entering said structure through said air inlet opening downwardly through said structure and toward said air outlet opening.

4,420,940
THERMO-ELECTRIC INSTALLATIONS

Jean Buffet, Paris, France, assignor to Air Industrie, Courbevoie, France

Filed Dec. 21, 1981, Ser. No. 332,596
Claims priority, application France, Dec. 23, 1980, 80 27374; Dec. 3, 1981, 81 22636
Int. Cl.³ F25B *21/02*
U.S. Cl. 62—3 **10 Claims**



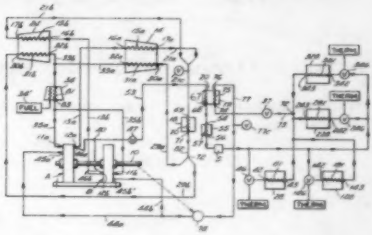
1. A thermo-electric installation comprising:
a first network of hot tubes, extending between two ends, disposed in parallel relation and in which flows a hot fluid,
a second network of cold tubes, extending between two ends, disposed in parallel relation and in a plane parallel to the plane of the hot tubes, and in which flows a cold fluid,
thermo-elements mounted between said hot tubes and said cold tubes,
at least two mechanical connection structures, called hot structures, connecting the hot tubes together, respectively towards their two ends, these two hot structures being formed by hot flanges, each connecting together the tubes of a layer of hot tubes, and
at least two mechanical connection structures, called cold structures, connecting together the cold tubes, respectively towards their two ends, these two cold structures being formed by cold flanges, each connecting together the tubes of a layer of cold tubes, the size of these hot and cold flanges in a direction perpendicular to the plane of the tubes being such that there exists a clearance between two adjacent hot and cold flanges,
and fixing devices comprising a plurality of rods adapted to pass through the two successions of hot and cold flanges which are located respectively at the two ends of the hot tubes and of the cold tubes, said fixing devices providing said transverse connection perpendicular to the hot tubes and to the cold tubes between the hot structures and the cold structures,
whereby the first and second network of hot and cold tubes are maintained, or an application force between said hot and cold tubes and said thermo-elements is created or both.

4,420,941
COOLING SYSTEM

Demos Papastavros, 2429 NE. 184 Ter., N. Miami Beach, Fla. 33160

Filed May 10, 1983, Ser. No. 493,229
Int. Cl.³ F25D *9/00*
U.S. Cl. 62—402 **17 Claims**

1. In a cooling system having
condenser means having an inlet and an outlet;
and evaporator means having an inlet operatively connected to said condenser means to receive refrigerant fluid therefrom and cause said fluid to boil, said evaporator means having an outlet;
the combination of:
a turbine having fluid inlet and outlet means;
a first heat exchanger having a first fluid passageway arrangement operatively connected to receive hot turbine exhaust fluid from said turbine outlet means;
a condenser operatively connected to receive fluid from said first passageway arrangement in said first heat exchanger;
said first heat exchanger having a second fluid passageway arrangement operatively connected to receive fluid from said last-mentioned condenser, said second fluid passageway arrangement being in heat exchange relationship to said first fluid passageway arrangement in said first heat exchanger;
a heater operatively connected between said second fluid passageway arrangement in said first heat exchanger and said turbine inlet means to heat fluid returning to the latter



from said second fluid passageway arrangement in said first heat exchanger;
an additional heat exchanger having a first fluid passageway arrangement operatively connected between said turbine outlet means and the inlet of said first-mentioned condenser means, said additional heat exchanger having a second fluid passageway arrangement operatively connected to receive fluid from the outlet of said evaporator means, said second fluid passageway arrangement in said additional heat exchanger being in heat exchanger relationship to said first fluid passageway arrangement therein;
and a compressor operatively connected between the outlet of said second fluid passageway arrangement in said additional heat exchanger and said turbine inlet means to compress fluid returning to the turbine from said additional heat exchanger.

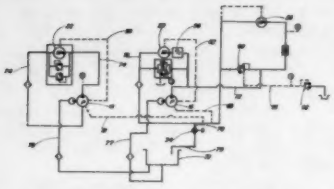
4,420,942
NITROGEN LIQUID TO GAS CONVERTER EMPLOYING WATER HEAT EXCHANGERS

Warren E. Davis, 304 Everette Dr., Houma, La. 70360, and Donald W. Granger, Rte. #11, Box 832, Lake Charles, La. 70601

Filed Jul. 16, 1982, Ser. No. 399,013
Int. Cl.³ F17C *7/02*
U.S. Cl. 62—53 **43 Claims**

1. An apparatus for converting liquid nitrogen to gaseous nitrogen comprising:
a. a source of liquid nitrogen;
b. at least one liquid nitrogen inlet;
c. means for pumping said liquid nitrogen connected to said inlet;
d. engine means for driving said pumping means having engine fluid flow therethrough;
e. first heat exchanger having first fluid flow therethrough and connected to said means for pumping liquid nitrogen wherein heat is provided from said first fluid to said liquid nitrogen thereby converting said liquid nitrogen to gaseous nitrogen;

f. means for conducting said first fluid through said first heat exchanger; and



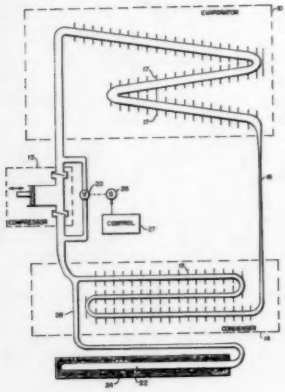
g. second heat exchanger having said first fluid flow therethrough and providing engine fluid from said engine means in heat exchange relation with said first fluid.

4,420,943

METHOD AND APPARATUS FOR REFRIGERATOR DEFROST

Lawrence G. Clawson, Dover, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed May 10, 1982, Ser. No. 376,886
Int. Cl.³ F25B *41/00*
U.S. Cl. 62—81 **15 Claims**



1. A refrigeration system comprising:

an evaporator;

a condenser;

a reservoir for holding refrigerant;

a compressor having its input coupled to said evaporator and its output coupled in parallel to said condenser and said reservoir wherein, during a steady state cooling cycle when said compressor is activated, said compressor pumps refrigerant from said evaporator to said condenser and said reservoir to provide a first pressure in said condenser and said reservoir and a second pressure in said evaporator, said first pressure being substantially higher than said second pressure;

a capillary connecting said condenser to said evaporator for completing the refrigerant cooling cycle loop;

a thermal mass thermally coupled to said reservoir;

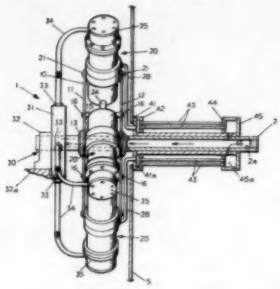
means for deactivating said compressor and for opening a passage wherein the pressure at the input to said compressor is rapidly equalized with the pressure at the outlet of said compressor at an intermediate pressure between said first and second pressures wherein said refrigerant evaporates in said reservoir, flows through said passage, and condenses in said evaporator, said condensing providing heat to melt ice off the outside of said evaporator; and the heat for continued evaporation of said refrigerant in said reservoir being provided from said thermal mass.

4,420,944

AIR COOLING SYSTEM

Edwin W. Dibrell, San Antonio, Tex., assignor to Centrifugal Piston, Expander, Inc., San Antonio, Tex.

Filed Sep. 16, 1982, Ser. No. 418,651
Int. Cl.³ F25B *9/00*
U.S. Cl. 62—86 **34 Claims**



1. Air cooling apparatus comprising, in combination: a rotatable body; power means for rotating said body; a cylinder element defining a fluid pressure chamber; a piston element cooperable with said fluid pressure chamber; means for mounting one of said elements on said rotatable body at a position radially spaced from the axis of rotation of said rotatable body, whereby centrifugal force produces relative movement of said piston element in said fluid pressure chamber in a direction to reduce the volume of said fluid pressure chamber; a first valve means communicating with said fluid pressure chamber and openable only when said piston element approaches the minimum volume position relative to said fluid pressure chamber; a second valve means communicating with said fluid pressure chamber openable only when said piston is remote from said minimum volume position relative to said fluid pressure chamber; one said valve means being closed whenever the other said valve means is open; a room air heat exchanger having refrigerant fluid passages therethrough; a compressor co-rotatable with said hollow body; and conduit means for circulating a refrigerant fluid from said second valve means, through said refrigerant fluid passages of said heat exchanger, to the inlet of said compressor and from the outlet of said compressor to said first valve means.

4,420,945

METHOD AND APPARATUS FOR EXTRACTING ENERGY FROM A PRESSURED GAS

Edwin W. Dibrell, San Antonio, Tex., assignor to Centrifugal Piston, Expander, Inc., San Antonio, Tex.

Continuation-in-part of Ser. No. 436,412, Oct. 25, 1982. This application Dec. 20, 1982, Ser. No. 451,606
Int. Cl.³ F25D *9/00*
U.S. Cl. 62—86 **34 Claims**

1. Apparatus for extracting heat and mechanical energy from a pressured gas comprising: a body rotatable about an axis; power means for rotating said body; a plurality of cylinder elements secured to said rotating body in an equi-spaced array around said axis; each said cylinder element defining an elongated fluid pressure chamber; a free piston movable longi-

tudinally in each said fluid pressure chamber; said cylinder elements being fixed on said rotatable body with the path of movement of each free piston extending from a position proximate to said axis to a position remote from said axis; whereby centrifugal force will move said free pistons to said remote position; inlet valve means communicating between a source of pressured gas and the remote end of each said cylinder ele-

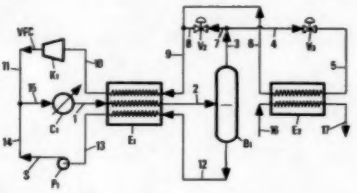
ment; means for opening said inlet valve means only when all of said free pistons reach said remote positions to concurrently receive a charge of pressured gas in the respective fluid pressure chamber; and exhaust valve means respectively communicating with said fluid pressure chambers and openable only when said free pistons respectively approach said proximate position, whereby said free pistons are removed in substantial synchronism in response to said each charges of pressured gas.

4,420,946

PROCESS FOR PRODUCING COLD OPERATED WITH PHASE SEPARATION

Alexandre Rojey, Garches; Joseph Larue, Vaucresson, and Alain Barreau, Chatou, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Dec. 1, 1981, Ser. No. 326,320
Claims priority, application France, Dec. 1, 1980, 80 25514
Int. Cl.³ F25B *15/00*
U.S. Cl. 62—101 **20 Claims**



1. In a process for producing cold in a phase separation cycle, which comprises the steps of:

(a) compressing, in a compression zone, a gas phase of a refrigerant fluid, to form a compressed gas phase, dissolving at least in part the compressed gas phase in a liquid solvent phase, to obtain a solution, and transferring at least in part the compression heat and the dissolution heat to an external cooling fluid,

(b) cooling the solution recovered from step (a) in the manner defined in step (d) hereinafter, to obtain the separation of the solution into two distinct liquid phases,

(c) separating the light liquid phase from the heavy liquid phase,

(d) contacting the heavy liquid phase of step (c), in heat exchange relationship, with the solution to be cooled of step (b), and thereafter supplying said heavy liquid phase, as a solvent phase, to step (a) to dissolve an additional amount of compressed gas phase,

(e) expanding the light liquid phase of step (c) and vaporizing it to produce cold,

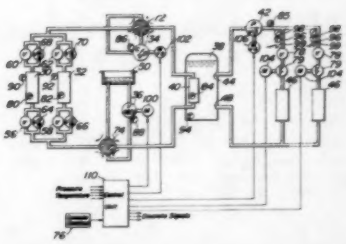
(f) recycling the vaporized light phase of step (e) to the compression zone of step (a) as a gas phase of refrigerant fluid, with the improvement comprising: dividing the light liquid phase in step (e) into at least two portions (F_1) and (F_2); vaporizing the one portion (F_1) of the light liquid phase in heat exchange contact with the solution from step (a), to further decrease the temperature of said solution and to facilitate its separation in step (b); and vaporizing the other portion (F_2) of said light liquid phase in heat exchange contact with an external medium which is cooled, and said external medium being a medium other than the solution recovered from step (a).

4,420,947

HEAT PUMP AIR CONDITIONING SYSTEM

Hozo Yoshino, Tokyo, Japan, assignor to System Homes Company, Ltd. and Mitsubishi Denki Kabushiki Kaisha, both of Tokyo, Japan

Filed Jul. 2, 1982, Ser. No. 394,866
Claims priority, application Japan, Jul. 10, 1981, 56-106893
Int. Cl.³ F25B *13/00*; F24J *3/02*
U.S. Cl. 62—160 **31 Claims**



1. A heat pump air conditioning system, comprising:

a refrigeration cycle having a compressor for compressing a refrigerant, means for exchanging heat including an evaporator for evaporating said refrigerant and a condenser for condensing said refrigerant, and an expansion valve for controlling passage of said refrigerant;

first means for measuring an ambient temperature;

second means for measuring a temperature of said refrigerant;

third means for measuring a pressure of said refrigerant; and

controlling means receiving the measured data of said ambient temperature, said temperature of said refrigerant and said pressure of said refrigerant for controlling a rotational speed of said compressor and an opening of said expansion valve in accordance with said measured data to maximize a coefficient of performance of said refrigeration cycle.

4,420,948

APPARATUS FOR DISPENSING HARD ICE CREAM AND THE LIKE

Don H. Savage, No. 2 Windsong, Sandy, Utah 84070

Filed Mar. 12, 1981, Ser. No. 243,124
Int. Cl.³ B29C *1/00*; A23G *3/18, 9/28*
U.S. Cl. 62—340 **35 Claims**

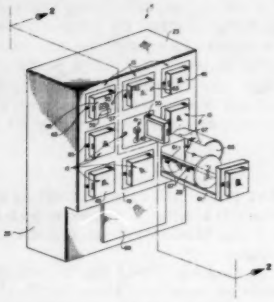
1. An apparatus for dispensing a semisolid substance in scoops having a generally spherical shape and a uniform consistency, said apparatus comprising:

a closed container into which said semisolid substance may be loaded;

pressure means for forcing said semisolid substance against a front wall of said closed container;

exit means for allowing said semisolid substance to exit through said front wall in response to said pressure means;

scoop dispensing means coupled to said exit means for forming said semisolid substance into a scoop having a generally spherical shape and a uniform consistency, and for delivering said spherical scoop to a user of said apparatus;



said semisolid substance comprising a food;

said pressure means comprising a helical spring adapted to apply a force against said movable end wall of said closed container; and

said pressure means further including motor means for compressing said spring to a desired force level.

4,420,949

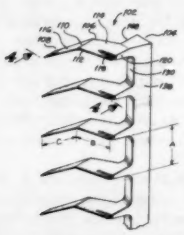
SEAWATER ICE MAKING APPARATUS

Don S. Bartholmey, Bellevue; Ronald D. Babcock, and George L. Weisel, both of Seattle, all of Wash., assignors to North star Ice Equipment Corporation, Seattle, Wash.

Filed Jun. 23, 1982, Ser. No. 391,460

Int. Cl.³ F25C *1/14*

U.S. Cl. 62—354 **21 Claims**



1. In a salt water ice making machine having a freezing surface upon which ice is formed in a thin sheet, an improved knife for dislodging ice from the freezing surface and means for supporting and moving the knife along the freezing surface, said improved knife comprising:

(a) an elongate leading section extending along said freezing surface and having:

a leading cutting edge extending along the portion of said leading section disposed adjacent to said freezing surface in close proximity to said freezing surface; and

a generally planar leading face surface disposed transversely to said freezing surface; and

(b) an elongate trailing section angularly disposed relative to said leading section, said trailing section:

having a trailing cutting edge extending along the portion of said trailing section disposed adjacent to said freezing surface in close proximity to said freezing surface to form a continuous cutting edge with the leading cutting edge; and

a trailing face surface disposed at an obtuse angle relative to the leading face surface.

4,420,950

PLANT FOR UTILIZATION OF LOW-POTENTIAL WASTE HEAT OF A GAS-PIPELINE COMPRESSOR STATION

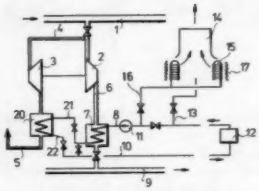
Janos Bodas; Istvan Papp; György Palfalvi, and Zoltan Vadas, all of Budapest, Hungary, assignors to Energiagazdalkodasi Intezet, Budapest, Hungary

Filed Apr. 1, 1982, Ser. No. 364,537

Claims priority, application Hungary, Apr. 1, 1981, 835/81

Int. Cl.³ F25D *9/00*

U.S. Cl. 62—402 **4 Claims**



1. A plant for utilization of low-potential waste heat of a gas pipeline compressor station, comprising means to convey gas in gaseous phase to the station at relatively low pressure, means to convey gas in gaseous phase away from the station at a relatively high pressure, a gas compressor between the low pressure means and the high pressure means, a gas expansion motor fed from the low pressure means and driving said compressor, a heat exchanger between the compressor and the high pressure means for cooling gas compressed in said compressor, means to circulate a cooling liquid in a closed circuit in heat exchange with said heat exchanger, a heat consumer warmed by said liquid heated in said heat exchanger, a circulation pump for circulating said liquid in said closed circuit, and means controllably to divert a selected portion of said liquid through an air cooling tower thereby to remove a selected amount of heat from said liquid in addition to the heat which is removed by said heat consumer.

4,420,951

FILTER AND DISPENSER SYSTEM FOR AUTOMATIC WASHERS

Jack F. Clearman, Blakely, Ga.; James R. Hageman, Pipestone Township, Berrien County, and Clark I. Platt, St. Joseph Township, Berrien County, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Jun. 23, 1982, Ser. No. 391,004

Int. Cl.³ D06F *39/02*

U.S. Cl. 68—17 R **20 Claims**

3. In an automatic washer having a cabinet housing a basket for containing clothes to be washed, a vertically disposed motor driven agitator within said basket, an additive dispenser system for said automatic washer comprising:

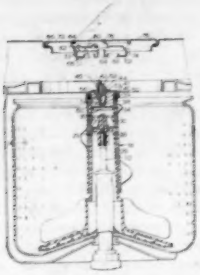
means for pumping liquid up through said agitator;

nozzle means pivotally mounted in the top of said agitator and communicating with said pumped liquid,

said nozzle movable between a first position and a second position;

filtering means positioned to receive liquid from said nozzle in said first position;

additive dispensing means positioned to receive liquid from said nozzle in said second position; and



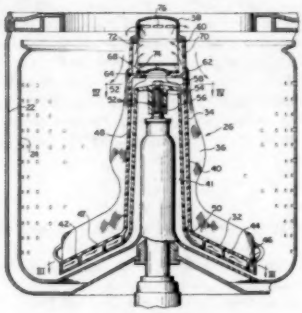
control means operable to move said nozzle from said first position to said second position.

4,420,952

LIQUID PUMPING AGITATOR WITH BARREL VALVE FOR AUTOMATIC WASHERS

Robert A. Brenner; Jack F. Clearman, and Clark I. Platt, all of St. Joseph Township, Berrien County, Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Sep. 19, 1981, Ser. No. 294,138
Int. Cl.³ D06F *17/10*
U.S. Cl. 68—53 **17 Claims**



15. A washing machine agitator comprising:

a vertical barrel portion defining an outlet and an interior passage extending upwardly from a lower end of said barrel to said barrel outlet, a passage forming means at said lower end of said barrel portion for defining an interior arcuate passage with an inlet and an outlet; and

a free floating disc valve means in said barrel interior passage for retarding the downward flow of washing liquid from said barrel passage through said arcuate passage.

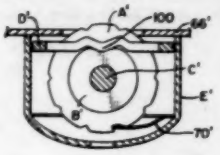
4,420,953

COMBINATION LOCKS

Richard C. Remington, Pompton Plains, N.J., assignor to Presto Lock, Inc., Garfield, N.J.

Division of Ser. No. 33,540, Apr. 26, 1979, Pat. No. 4,308,731. This application Oct. 7, 1981, Ser. No. 309,506
Int. Cl.³ E05B *65/48*
U.S. Cl. 70—74 **5 Claims**

1. A combination lock having a plurality of dials, each coupled to a corresponding rotary element having a peripheral portion that must be turned to a predetermined position relative to cooperable means to permit the lock to be opened, by relative sliding movement between the rotary elements and the cooperable means in a direction axially of a shaft upon which the rotary elements are supported for rotation, characterized in that the peripheral portion has a notch and the cooperable means has a ridge portion for each notch, each dial having a series of indicia spaced about its periphery with one indicium displayed when the peripheral portion of the corresponding rotary element has said predetermined position, each rotary element being disposed axially adjacent the corresponding ridge portion and having a blocking interface with the corresponding ridge portion preventing relative sliding movement between the rotary elements and the cooperable means when the corresponding dial is turned to display an indicium that



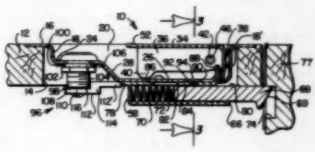
succeeds said one indicium at either side thereof, with the areas of the interface at opposite sides of a plane extending from the axis of the shaft to the peak of said corresponding ridge portion being equalized sufficiently to prevent that rotary element from turning its notch to said predetermined position in response to pressure exerted by said corresponding ridge portion, and said blocking interfaces being cleared when the peripheral portions of the rotary elements have said predetermined positions to align the respective ridge portions and notches.

4,420,954

FLUSH MOUNTABLE DOOR LATCH MECHANISM

Gabriel C. Hieronymi, Sloatsburg, N.Y., and Randall C. Hansen, Gurnee, Ill., assignors to Abex Corporation, New York, N.Y.

Filed Dec. 14, 1981, Ser. No. 330,738
Int. Cl.³ E05B *55/04*; E05C *1/14*
U.S. Cl. 70—150 **8 Claims**



1. A latch mechanism which comprises a tray; a bottom surface formed in the tray, wherein the bottom surface of the tray is recessed; a handle; means for pivotally mounting the handle within the tray such that the handle overlies the recessed bottom surface, wherein the handle is pivotable between a stored position and an operated position; an actuator formed on one end of the handle; means for housing a bolt, wherein the housing means is on back of the bottom surface of the tray; a bolt slidably mounted in the housing means and movable between an extended position and a retracted position; means for biasing the bolt into the extended position; a top surface on the bolt which faces the bottom surface of the tray; a slot formed in the bottom surface of the tray; a slide bar mounted in the bolt housing between the bottom surface of the tray and the top surface of the bolt, wherein the slide bar is movable between a locked position and an unlocked position and a part of the slide bar projects upwardly through the slot in the bottom surface; and means connecting the slide bar with the bolt, wherein the biasing means biases the bolt into engagement with the slide bar and the handle actuator engages the slide bar projection as the handle is moved from the stored position to the operated position to move the slide bar from the

locked position to the unlocked position which simultaneously moves the bolt from the extended position to the retracted position.

4,420,955

PERMUTATION LOCK

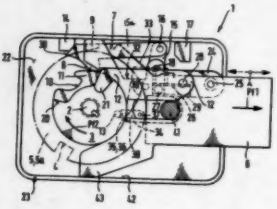
Ulrich Marold, Hinterzarten, Fed. Rep. of Germany, assignor to Theodor Kromer GmbH & Co. KG, Umkirch, Fed. Rep. of Germany

Filed Jul. 28, 1981, Ser. No. 287,825

Claims priority, application Fed. Rep. of Germany, Aug. 6, 1980, 3029735

Int. Cl.³ E05B *37/08*

U.S. Cl. 70—303 A **43 Claims**



1. A permutation lock, comprising a housing; a locking bolt installed in and movable with reference to said housing between extended and retracted positions; a plurality of rotary tumblers in said housing; means for rotating said tumblers relative to each other to and from predetermined positions, said rotating means comprising a cam in said housing; locating means movable in said housing into engagement with said cam only in said predetermined positions of said tumblers so as to effect a movement of said bolt to one of said positions in response to rotation of said cam; and a coupling device movable in said housing to and from an operative position in which said device moves said bolt to the other of said positions in response to rotation of said cam, one of said tumblers having means for effecting a movement of said device to said operative position in response to movement of said one tumbler from the predetermined position thereof so that such movement of said one tumbler must precede the movement of said bolt to said other position.

4,420,956

COMBINATION LOCK

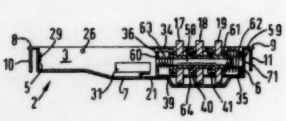
Sze Y. Li, Kowloon, Hong Kong, assignor to Kwoon Kwen Metal Ware Company Ltd., Kowloon, Hong Kong

Filed Apr. 6, 1981, Ser. No. 251,690

Claims priority, application United Kingdom, Apr. 9, 1980, 8011671

Int. Cl.² E05B *37/02, 65/52*

U.S. Cl. 70—312 **2 Claims**



1. A combination lock comprising a housing; a tongue member; a latch member pivotably mounted in said housing for movement between a latched position and an unlatched position and capable, when in said latched position, of securing said tongue member against removal from said housing; bolt means for locking said latch member in said latched position; projections on said bolt means; a plurality of cams; a spring biassing said bolt means to a release position and so moved to said release position when said projections on said bolt means can engage in respective recesses in said cams; and a plurality of wheels each associated with a respective one of said plurality of cams, said wheels each being manually indexable around, bearing a visible marking and when indexed entraining for movement the respective one of said plurality of cams, whereby when each of said wheels is rotated to a respective determined position of rotation as indicated by said marking thereon, said projections from said bolt means can enter said recesses in said cams to allow said bolt means to move to said release position, but in all other rotational positions of said wheels and said cams, said bolt means is pressed by said cams into said locked position in which it prevents said pivotably mounted latch member pivoting to said unlatched position and thus retains said tongue member against movement away from said pivotably mounted latch out of said housing; wherein each of said cams is formed as a stepped cylindrical bush rotatable on a mounting pin, said recesses in said cams are provided as a respective recess in each said bush to receive a respective one of said projections from said bolt means and each said recess is provided in a larger diameter portion of said respective stepped bush, said respective wheel is rotatable, to change the combination of said lock, on a smaller diameter portion thereof and at least one projection is provided, to effect said inter-locking of said cam and said respective wheel, projecting from said bush at the position of the step thereon between said portions of different diameter; and wherein said bolt means comprises an angled plate member having a first limb with a projection at its free end to engage said pivotably mounted latch, slots are provided in said first limb through respective ones of which slots portions of said wheels can project with lateral clearance and depressed portions are provided in said first limb forming said projections to cooperate with said recesses in said cams, a second limb of said angled plate member extends at right angles to said first limb and has an aperture therein through which said mounting pin projects, and movement of said bolt means between its said locking and release positions causes said first limb to move in the plane of said first limb and parallel to said mounting pin.

4,420,957

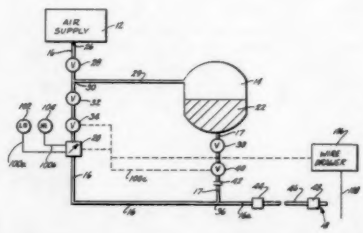
MONITOR METHOD AND APPARATUS FOR PARTICLE BLASTING EQUIPMENT

Joseph H. Weber, Grand Rapids, Mich., assignor to Progressive Blasting Systems, Inc., Grand Rapids, Mich.

Filed Oct. 26, 1981, Ser. No. 314,792

Int. Cl.³ B21J *00/00*

U.S. Cl. 72—1 **24 Claims**



1. An improved particle blasting apparatus for monitoring media flow, nozzle wear, and nozzle blockage, said equipment having a source of compressed air, a nozzle defining a restricted opening, means conveying said compressed air from said source to said nozzle in an airstream, and means operatively connected to said air conveying means introducing particle blasting media into said airstream, whereby said media is carried through said nozzle by said airstream, wherein the flow rate of said airstream through said air conveying means is

affected both by the amount of said media introduced into said airstream and by the effective size of said restricted opening in said nozzle, wherein the improvement comprises air flow metering means operatively connected to said air conveying means indicating said flow rate through said air conveying means, whereby insufficient media introduction and an excessive size of said restricted opening increases said flow rate causing said metering means to indicate an excessive flow rate greater than a predetermined maximum parameter, and whereby excessive media introduction and blockage of said nozzle reduces said flow rate causing said metering means to indicate an insufficient flow rate less than a predetermined minimum parameter.

4,420,958

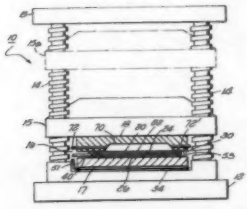
METHOD AND APPARATUS FOR REGULATING PRESELECTED LOADS ON FORMING DIES

David W. Schulz, Hermosa Beach, and Edward D. Weisert, Rolling Hills Estates, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Continuation of Ser. No. 148,873, May 12, 1980, Pat. No. 4,306,436. This application Dec. 17, 1981, Ser. No. 331,749

Int. Cl.³ B21B *37/08*

U.S. Cl. 72—21 **13 Claims**



1. In the method of making a structure from at least one workpiece wherein said at least one workpiece is constrained about its periphery between a pair of dies creating an actual gap therebetween, said dies applying a clamping force to said at least one workpiece, said dies being constrained between a pair of non-inflatable platens, and said at least one workpiece is formed within said pair of dies by fluid under pressure, the improvement comprising:

providing force adjustment means for varying said actual gap between said dies to adjust the force applied by said dies to said at least one workpiece;

sensing the actual gap between said dies during forming, and providing a first output signal proportional to the size of said actual gap;

providing a second output signal proportional to a preferred gap size between said dies; and

controlling said force adjustment means using said first and second signals such that the actual gap size substantially equals said preferred gap size during forming of said workpiece.

4,420,959

APPARATUS FOR THREADING CLOSURES

Roderick V. King, Girard, Pa., assignor to Ethyl Products Company, Richmond, Va.

Filed Dec. 31, 1980, Ser. No. 221,568

Int. Cl.³ B21D *1/08*

U.S. Cl. 72—113 **10 Claims**

1. An apparatus for forming lug threads in a closure having a top surface and an integral cylindrical wall comprising:

a. an apparatus support means;

b. nest means fixedly attached to said support means, said nest means having a vertically extending cylindrical bore therein with

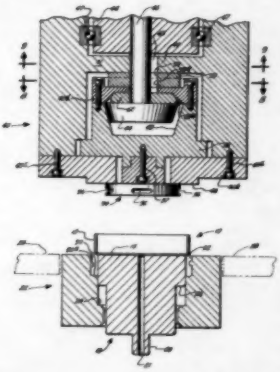
(i) an upper section having a plurality of inwardly directed thread forming members extending from the sidewall thereof and a first upwardly facing circular shoulder therebelow,

(ii) a lower, smaller diameter section terminating in an upwardly facing shoulder, and

(iii) a bottom opening below said lower section with a diameter smaller than said lower section;

c. closure support means slidably received in said nest means for moving a cap vertically into and out of said upper section of said nest means, and having a downwardly facing shoulder adapted to abut said second upwardly facing shoulder when in the fully retracted position and a lowermost portion extending through said bottom opening of said nest means;

d. horizontally movable, cylindrical threading tool means having indentions on the outside thereof matching said thread forming members on said nest means for forming threads in the cylindrical wall of said closure;



e. means for vertically inserting and withdrawing said threading tool means in said closure;

f. threading tool housing means axially aligned with said nest means and having threading tool carrier means mounted therein which is rigidly connected to said threading tool means, said carrier means including a carrier having a conical recess that has the shape of an inverted truncated cone located in its interior, and a truncated conical actuator adapted to slide into and out of said recess to move said threading tool carrier means transversely to bring said threading tool means into contact with said cylindrical wall of said closure; and

g. orbiting means for moving said threading tool means in an orbital path whereby the axis of said threading tool moves in a circle about the axis of said closure while preventing rotational and axial movement of said threading tool about its own axis.

4,420,960

ARRANGEMENT FOR HOT-ROLLING OF METAL WORKPIECES

Hans W. Grasshoff, Dortmund, Fed. Rep. of Germany, assignor to Estel Hoesch Werke Aktiengesellschaft, Dortmund, Fed. Rep. of Germany

Filed May 5, 1981, Ser. No. 260,188

Claims priority, application Fed. Rep. of Germany, May 20, 1980, 3019123

Int. Cl.³ B21B *1/26, 41/02, 41/06, 45/00*

U.S. Cl. 72—202 **1 Claim**

1. Arrangement for continuous hot-rolling of metal workpieces, comprising:

first means, including at least one roughing stand in which

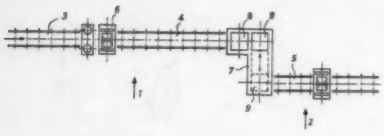
the workpiece is rough-rolled to a product having roughly the desired dimensions while advancing along a first path;

second means, including at least one finishing stand in which the rough-rolled product is finish-rolled to the final desired dimensions while advancing along a second path which is offset from said first path;

a heat-retaining station extending between an end of said first path and a beginning of said second path;

a take-up coiler in said heat-retaining station at a location adjacent said end of said first path for coiling up the rough-rolled product; and

transporting means in said heat-retaining station for transporting the coiled-up rough product from said location to said beginning of said second path; said transporting means and take-up coiler separating said first means from said second means inside a continuous rolling train, said product being retained hot in passage through said take-up coiler and transporting means, winding of the coil producing a heating effect for retaining said coil in heated condition due to reduction in exposed surface from which heat flow may take place, said heat-retaining station comprising a coiling and uncoiling station, said heating station being free from externally supplied heat; said first and second paths being laterally offset from one another, said transporting means comprising an uncoiler for paying out coiled rough product, said uncoiler being movable between said location and said beginning of said second paths, said first and second paths being so offset relative to one another as to form with said heat retaining station a Z-shaped outline, said roughing stand of said first means being a reversing stand and said first means further including a string of run-out rollers extending from said reversing stand to said heat-retaining station and extending underneath the take-up coiler and the transporting means and beyond said heat-retaining station in line with said first path.



4,420,961

METHOD FOR PRODUCING BEAM BLANK FOR UNIVERSAL BEAM

Yoshiaki Kusaba, Nishinomiya, and Chihiro Hayashi, Takarazuka, both of Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan

Filed Jun. 10, 1982, Ser. No. 387,202

Claims priority, application Japan, Jul. 10, 1981, 56-107940; Apr. 30, 1982, 57-72706

Int. Cl.³ B21B *1/10*

U.S. Cl. 72—221 **4 Claims**

1. A method for producing a beam blank for a universal beam, comprising the steps of:

making a slit longitudinally of a flat slab in each of both the side edges thereof by hot rolling using a plurality of pairs of knifing calibers each having a triangular projection at the center of the bottom thereof, said triangular projections having the same predetermined apical angles and heights gradually increasing sequentially;

gradually deepening the slit; and

gradually widening the slit after the depth of the slit has reached a predetermined value, wherein during the steps of making the slit and deepening the slit, tip ends of the material on both sides of the slit are substantially free from reduction caused by the bottom of the caliber.

4,420,962

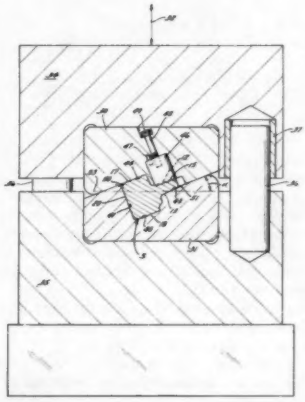
METHOD OF COLD COINING A TOOTHED SEGMENT FOR AN ENDLESS TRACK WHEEL AND TWO-PIECE DIE THEREFOR AND ARTICLE FORMED THEREBY

Donald J. Peterson, Racine, Wis., assignor to Walker Forge, Inc., Racine, Wis.

Filed Sep. 2, 1981, Ser. No. 298,451

Int. Cl.³ B21D *22/00*

U.S. Cl. 72—360 **22 Claims**

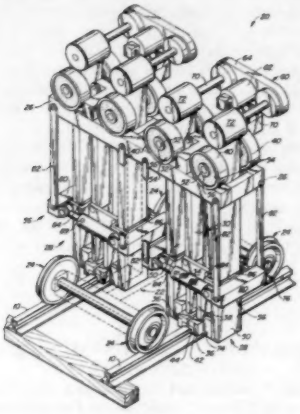


1. A method of manufacturing and finishing without machining of various surfaces of a toothed segment for an endless track wheel and wherein said surfaces are arranged generally at right angles to one another, the method comprising inserting a rough blank in an open two piece die that closes along one direction and positioning said blank in said die so that said surfaces are at an inclined angle to said direction, closing said die whereby said die creates forces simultaneously on all of said surfaces to accurately finish said surfaces and accurately locate them relative to one another, wherein said segment is arcuate in shape and has a radially inwardly extending, central mounting flange with opposite sides, said segment also has an outer driving tooth portion extending laterally beyond either of said flange opposite sides, said portion having opposite sides and a gear tooth profile surface formed between its sides and at an angle of about ninety degrees with respect thereto, said surfaces to be finished including (1) at least a part of one side of said flange, (2) said opposite sides of said driving tooth portion and (3) said gear tooth profile surface.

4,420,963
IMPACT RAIL FORGER

Raymond A. Gurries, Reno, Nev., assignor to Resonant Technology Company, Sparks, Nev.

Filed Dec. 7, 1981, Ser. No. 328,163
Int. Cl.³ B21J 7/20
U.S. Cl. 72—407 16 Claims



1. An apparatus for impact forging an elongate object such as a rail, said apparatus comprising:

a mobile frame that is capable of travelling along the object in place;

first and second forging shoes located so that the first shoe lies on one side of the object and the second shoe lies on the opposite of the object;

first and second resonant beams having anti-nodes at each end and at least one node spaced inward from the end, said beams being suspended from the frame from a location on the beam substantially coincident with the uppermost node so that the lower anti-nodes of the beams are located on the outer sides of the respective forging shoes; and

means for inducing a lateral wave in each of the beams at or near its resonant frequency whereby the beams drive the forging shoes in phase against the opposite sides of the rail.

4,420,964
METHOD OF AND APPARATUS FOR THE PRESSWORKING OF ARTICLES

Alexander S. Petrov, and Mihail S. Konstantinov, both of Sofia, Bulgaria, assignors to V M E I "Lenin", Sofia, Bulgaria

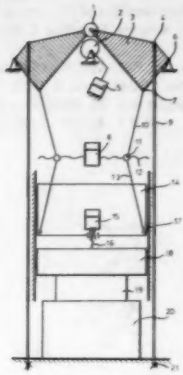
Filed Apr. 28, 1981, Ser. No. 258,420
Claims priority, application Bulgaria, Apr. 29, 1980, 47580
Int. Cl.³ B21J 9/18
U.S. Cl. 72—451 7 Claims

1. A method of operating an apparatus for the press working of an article in which a movable tool member is urged against said article, said method comprising the steps of

(a) storing force in a force-storing element over a first time interval;

(b) driving said tool against said article with force stored in said element during a second time interval;

(c) storing force in said element during a third time interval immediately following said second time interval while simultaneously and independently of the storage of force



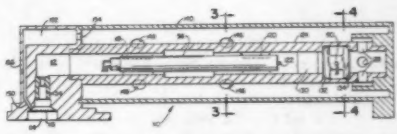
in said element, maintaining the advance of said tool against said article; and

(d) repeating steps (b) and (c) at least once.

4,420,965
COOLING EFFECT SENSOR

Thomas P. Farkas, Bloomfield; Gary D. Burr, Berlin, and Robert W. Smith, Simsbury, all of Conn., assignors to Dynamic Controls Corporation, South Windsor, Conn.

Division of Ser. No. 943,300, Sep. 17, 1978, Pat. No. 4,257,552.
This application Aug. 21, 1980, Ser. No. 179,938
Int. Cl.³ G01M 17/06
U.S. Cl. 374—43 5 Claims



1. A cooling effect sensor for detecting the cooling capacity of a moving heat transfer fluid comprising:

conduit means defining a fluid passageway having an entrance at one end for receiving the moving fluid and an exit at the other end from which the moving fluid is discharged;

an insulating jacket mounted over the conduit means and having one end communicating with the fluid passageway at the entrance and an opposite end communicating with the fluid passageway at the exit, and discharge vents in the jacket intermediate the one and opposite ends;

heating means connected with the conduit means for applying predetermined quantities of heat to the moving fluid in the fluid passageway; and

temperature sensing means positioned in the fluid passageway downstream in the fluid flow from the heating means for measuring the temperature of the moving fluid to which the predetermined quantities of heat are applied.

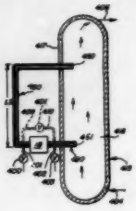
4,420,966
METHOD FOR DETERMINING SOLIDS OR LIQUIDS IN VAPOR

Lloyd A. Baillie, Homewood, and George A. Uhl, Crete, both of Ill., assignors to Atlantic Richfield Company, Philadelphia, Pa.

Division of Ser. No. 255,915, Apr. 20, 1981, abandoned, which is a division of Ser. No. 99,348, Dec. 3, 1979, Pat. No. 4,299,116. This application Jul. 20, 1982, Ser. No. 399,941

Int. Cl.³ G01N *15/06*

U.S. Cl. 73—28 **1 Claim**



1. A process for measuring changes in the amount of solids or liquids entrained in a vapor contained in a container by means of a photocell manometer having an orifice of a first sensor and an orifice of a second sensor located at different levels in vapor contact with said vapor within said container, said process comprising:

introducing a first vapor purge stream into said first sensor at a rate at least sufficient to maintain said first sensor uniformly filled with a vapor from said first vapor purge stream,

introducing a second vapor purge stream into said second sensor at a rate at least sufficient to maintain said second sensor uniformly filled with a vapor from said second vapor purge stream,

locating said orifice of said first sensor at a different relative height to said orifice of said second sensor, and

measuring a relative pressure transmitted by said first sensor relative to a pressure transmitted by said second sensor, whereby changes in said relative pressure indicate changes in said amount of entrained solids or liquids.

4,420,967
KNOCK DETECTOR

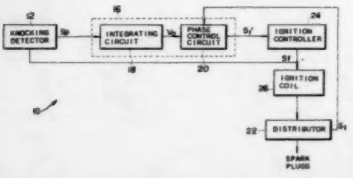
Toshio Enoshima, Fujisawa; Shoji Furuhashi, and Hideyuki Tamura, both of Yokohama, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Feb. 12, 1981, Ser. No. 234,008

Claims priority, application Japan, Feb. 18, 1980, 55-18426

Int. Cl.³ G01L *23/22*

U.S. Cl. 73—35 **22 Claims**



1. A knock detector for a spark ignition internal combustion engine, comprising:

a. a vibration sensor for sensing engine vibrations to produce a vibration signal corresponding to the vibrations;

b. means for transmitting therethrough a signal obtained from the vibration signal;

c. a reference level signal forming means including:

1. a rectifier for rectifying the vibration signal to produce a rectified signal;

2. an averaging means for smoothing the rectified signal to produce a smoothed signal; and

3. a first amplifying means for amplifying the smoothed signal to produce a reference level signal;

d. a comparator for comparing the signal from said transmitting means with the reference level signal to produce a knock signal representing the occurrence of knock when the former signal is greater in magnitude than the latter;

e. an engine speed determining means for sensing the engine speed to produce a drive signal when the engine speed exceeds a predetermined value; and

f. a changeover means responsive to the drive signal for changing the magnitude of the output of at least one of said transmitting means and the reference signal forming means such that the relationship in magnitude between the reference signal and the signal from the transmitting means before the drive signal is produced is maintained.

4,420,968
UNDESIRABLE COMBUSTION CHARACTERISTIC DETECTION APPARATUS

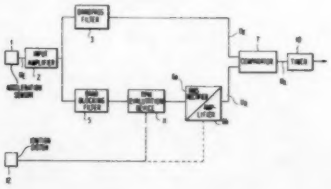
Ingo Dudeck, Weinstadt, and Manfred Maass, Esslingen, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Nov. 17, 1981, Ser. No. 322,224

Claims priority, application Fed. Rep. of Germany, Nov. 27, 1980, 3044745

Int. Cl.³ G01L *23/22*

U.S. Cl. 73—35 **7 Claims**

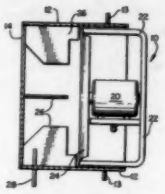


1. An apparatus for detecting undesirable combustion characteristics in the combustion process in a spark-ignited internal combustion engine and discriminating those characteristics from disturbances having similar characteristics which do not originate in the combustion process, the apparatus comprising sensor means for sensing solid borne signals and for providing a knocking frequency output signal in response thereto, band-pass filter means tuned to the frequency of an engine knocking vibration, wherein the output signal of the sensor means is fed to the band-pass filter means resulting in a knocking frequency signal, and band-blocking filter means for surpressing frequencies below a predetermined knocking vibration frequency lower than the knocking vibration frequency and frequencies above a predetermined knocking vibration frequency higher than the knocking vibration frequency, rotational speed evaluation means for evaluating an output signal from the band-blocking filter means, r.m.s. rectifier means arranged in series with the band-blocking filter means and evaluation means for forming a reference knock signal, comparator means for comparing the reference knock signal with the knocking frequency signal, and timer means responsive to the comparator means for supplying an output pulse of a predetermined duration when the comparator means senses the knocking frequency signal exceeds the reference knock signal.

4,420,969
ORIFICE METERING FAN DEVICE

Arthur M. Saum, Waynesboro, Va., assignor to Saum Enterprises, Inc., Falls Church, Va.

Filed Jun. 2, 1981, Ser. No. 269,755
Int. Cl.³ G01M *3/04*
U.S. Cl. 73—40 **14 Claims**

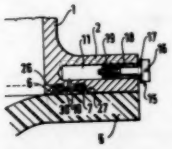


1. A device for transferring a gas and simultaneously measuring the volume flow rate of the gas, the device comprising
- a propeller-type fan for generating gas flow, said fan mounted within air-flow guide means concentrically spaced about the fan perimeter,
- drive means for rotating the fan,
- an orifice located upstream from the fan, the orifice comprising an opening in a plates said plate mounted at one end of a housing, which extends from the plate and encloses at least the air flow guide means of the device, the plane of the plate being approximately parallel to the plane of rotation of the fan, and the orifice and fan being spaced less than one fan diameter apart,
- said housing enclosing the space between the orifice plate and air flow guide means,
- means to adjust gas flow rate through the orifice in a controlled manner,
- one or more vanes mounted inside the housing between the fan and the orifice plate so as to direct gas flow in a generally axial direction relative to the fan, and
- pressure sensing means within the housing and located between the orifice plate and the fan.

4,420,970
APPARATUS FOR CHECKING FOR LEAKS FROM METAL-CLAD HIGH-TENSION ELECTRIC GEAR

Henri Organi, Villeurbanne, France, assignor to Alsthom-Atlantique, Paris, France

Filed Apr. 6, 1981, Ser. No. 251,441
Claims priority, application France, Apr. 17, 1980, 80 08591; Sep. 16, 1980, 80 19904
Int. Cl.³ G01M *3/26*
U.S. Cl. 73—46 **18 Claims**

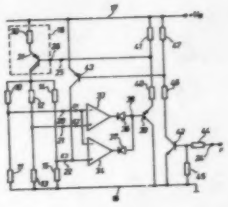


1. Apparatus for checking for leaks between the connection flanges of two portions of metal-clad electric gear, said flanges being sealed by means of two seals disposed concentrically in series on the facing surfaces of the flanges, said electric gear being filled with compressed gas, the improvement comprising a smooth bore hole in communication with the internal volume lying between the two seals and leading to the exterior of the metal-clad electric gear, and an axially compressible resilient cylindrical seal within said smooth hole, a screw projecting through said compressible resilient cylindrical seal from the exterior, said screw being threaded only at its end, leaving a smooth surface portion near the head thereof and projecting within said resilient cylindrical seal, a nut threaded to said threaded screw portion at its end and means for preventing rotation of said nut but allowing axial movement of the nut within said bore hole such that rotating said screw relative to said nut causes said resilient cylindrical seal to increase in diameter during axial compression for effecting fluid-tight sealing between said resilient cylindrical seal and both the smooth surface portion of said screw and said smooth bore hole.

4,420,971
DEVICE FOR FLOWTHROUGH RATE MEASUREMENT IN AN INTERNAL COMBUSTION ENGINE

Peter Rapps, Karlsruhe, and Ulrich Drews, Vaihingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jun. 18, 1981, Ser. No. 274,992
Claims priority, application Fed. Rep. of Germany, Jun. 18, 1980, 3022685
Int. Cl.³ G01F *1/68*
U.S. Cl. 73—118 **8 Claims**



1. A burnout device for flowthrough rate measurement for measuring the air throughput in the intake tube of an internal combustion engine comprising:
- a bridge circuit assembly having at least three voltage dividers connected to respective control voltages,
- a heated resistance material disposed in the flow of the medium included in one of said voltage dividers and at which a control voltage is connected for regulating the electric current through said resistance material,
- means for selectively connecting either one of the remaining two of said voltage dividers in conjunction with said one of said voltage dividers for a measurement or a burn-off operation, and
- control means responsive to said bridge circuit assembly for controlling said control voltage for regulating the electric current to said heated resistance material.

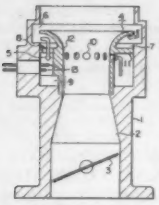
4,420,972
AIR INTAKE MEASURING APPARATUS FOR INTERNAL COMBUSTION ENGINE

Hiroshi Kuroiwa, Hitachi, and Yoshishige Oyama, Katsuta, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 7, 1982, Ser. No. 337,819
Claims priority, application Japan, Jan. 13, 1981, 56-4428
Int. Cl.³ G01M *15/00*
U.S. Cl. 73—118 **8 Claims**

1. An air intake measuring apparatus for an internal combustion engine, comprising:
- a main air path;
- a bypass for passing an amount of air in a predetermined ratio with respect to an amount of air passing through said main air path, said bypass being comprised of a straight path portion connected to an inlet of said bypass and a circumferentially curved path portion connected to an

outlet of said bypass, at least a part of said curved path portion situated closest to an outlet end of said straight path portion being separated by a wall relative to said main air path, whereby the amount of air passing through



the bypass will be directed, thereby, circumferentially of said main air path prior to returning to the main air path via said outlet; and

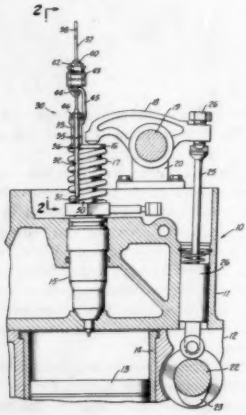
an air flow rate measuring element disposed in said bypass.

4,420,973

MAGNETICALLY ATTACHABLE TIMING GAUGE FOR A FUEL INJECTOR

Guillermo E. Garcia, 830 Dos Robles Pl., Alhambra, Calif. 91801

Filed Sep. 28, 1981, Ser. No. 306,201
Int. Cl.³ G01M *15/00*
U.S. Cl. 73—119 A **13 Claims**



1. A timing gauge for use in setting a fuel injector plunger while mounted in an engine said gauge comprising:

permanent magnet means having a conductive pole face adapted to hold said gauge firmly clamped to and supported solely by the outer end of an injector plunger;

a conductive probe secured to said magnet means and insulated therefrom, said probe extending a predetermined distance beyond said pole face and corresponding to the precise distance between the outer end of an injector plunger and a timing reference surface beside said plunger on an engine when the injector plunger is properly positioned to measure a fuel injection stroke; and

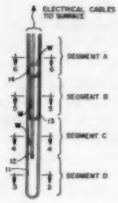
said permanent magnet means and said probe being adapted to be connected in series with a source of power and with indicator means groundable on the engine whereby said indicator means is activated when the injector plunger is so adjusted that the end of said probe is in contact with said timing reference surface at the beginning of a fuel injection stroke.

4,420,974

IN-SITU MEASUREMENT SYSTEM

David E. Lord, Livermore, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Nov. 24, 1980, Ser. No. 209,929
Int. Cl.³ E21B *49/00*; G01F *1/68*; H01G *3/04*
U.S. Cl. 73—154 **7 Claims**



1. An in situ measurement system for measuring temperatures and other parameters and conditions in an underground volume of interest, said system comprising:

a plurality of steel bar resistance elements emplaced in spaced relation in the underground volume of interest, each said bar having the same uniform and known temperature functional resistance characteristics along its length, each said element having a U-shaped open loop "hairpin" configuration with two parallel legs in close thermal proximity, said elements being arranged in pairs with the elements in each said pair sharing nearly a common path in close thermal proximity throughout the extent of the shorter element in the pair, and with the free ends of each said element disposed adjacent the free ends of the other elements; and

measurement means for obtaining, for said pairs, the electrical resistance of each element and the difference in electrical resistance of the two elements in each pair, whereby said resistance difference values may be used in analytical methods involving resistance as a function of temperature to obtain information with respect to said underground volume.

4,420,975

SYSTEM AND METHOD FOR DETERMINING THE RELATIVE PERMEABILITY OF AN EARTH FORMATION SURROUNDING A WELLBORE

Walter A. Nagel, and David J. Walsh, both of Englewood, Colo., assignors to Marathon Oil Company, Findlay, Ohio

Continuation-in-part of Ser. No. 279,094, Jun. 30, 1981, abandoned. This application May 23, 1983, Ser. No. 497,396
Int. Cl.³ E21B *49/00*
U.S. Cl. 73—155 **13 Claims**

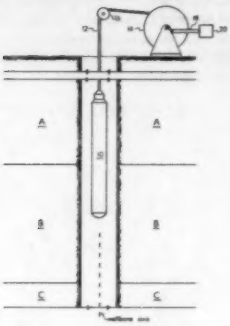
1. A method for determining the relative permeability of an earth formation surrounding a wellbore having a longitudinal axis comprising the steps of:

injecting a fluid into the wellbore such that the fluid invades the earth formation;

measuring at different points in time a quantity that varies in response to the radius from the wellbore axis of the fluid invasion into the earth formation;

determining in response to said quantity measurements the

radius from the wellbore axis of the fluid invasion into the earth formation at different points in time; and



determining in response to said radii determinations the relative permeability of the earth formation.

4,420,976

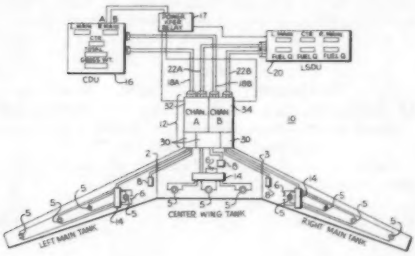
MULTIPLEXED TRUE MASS GAGING SYSTEM

Eugene F. Orloff, Long Beach, Calif.; Martin Horowitz, Lynbrook, and Charles H. Ritter, Great River, both of N.Y., assignors to McDonnell Douglas Corporation, Long Beach, Calif. and Gull Airborne Instruments, Inc., Smithtown, N.Y.

Filed Sep. 9, 1981, Ser. No. 300,570

Int. Cl.³ G01F *23/26*

U.S. Cl. 73—304 C **34 Claims**



1. A multiplexed true mass gaging system for aircraft with multiple fuel tanks comprising:

a plurality of tank probes situated in respective individual tanks for measuring the level of fuel therein;

a plurality of compensating capacitors, one in each tank, for developing signals proportional to fuel density;

a plurality of densitometers, one in each tank, for measuring the density of fuel therein, the signals from the tank probes, compensating capacitors and densitometers being combined to provide indications of the true mass of the fuel contained in an individual tank;

a cockpit display unit mounted in the aircraft cockpit and a load selector display unit mounted at a refueling station, each display unit including digital displays for providing indications of fuel quantity to an operator;

a standard electronic module mounted adjacent at least one of the tanks for converting analog signals corresponding to fuel level measurement data into serial digital data signals;

at least one signal channel including of a pair of shielded, twisted leads extending from the standard electronic module to each of the display units;

means for applying the serial digital data signals to said channel; and

means at each of the displays for receiving the digital data signals from said channel and utilizing them to energize the digital displays in accordance with the digital data signals.

4,420,977

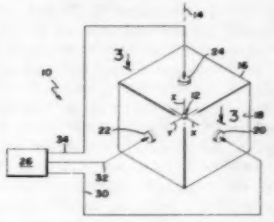
ACOUSTIC ROTATION CONTROL

Daniel D. Elleman, San Marino; Arvid P. Croonquist, Pasadena, and Taylor G. Wang, Glendale, all of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Mar. 15, 1982, Ser. No. 358,089

Int. Cl.³ H02N *11/00*

U.S. Cl. 73—505 **7 Claims**



1. A method for controlling rotation of an object, comprising:

applying acoustic waves along first and second different directions to said object, to establish standing wave patterns extending across the object location, with the wavelengths of the acoustic waves passing along said directions being equal;

said step of applying including controlling the relative phases of said acoustic waves so they are substantially 90° out of phase, and repeatedly switching the relative phases so that each acoustic wave alternately leads and lags the other one by 90°.

4,420,978

METHOD AND DEVICE FOR TRANSMITTING AND RECEIVING ELECTRO-MAGNETIC ULTRASOUND

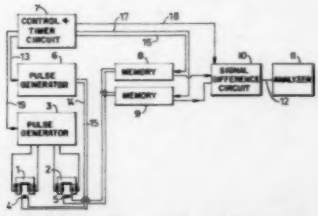
Thomas Robinson, and Willy Ohlsson, both of Nyköping, Sweden, assignors to Studsvik Energiteknik AB, Nyköping, Sweden

Filed Apr. 7, 1981, Ser. No. 251,888

Claims priority, application Sweden, Apr. 18, 1980, 8002948

Int. Cl.³ G01N *29/04*

U.S. Cl. 73—643 **5 Claims**



1. An apparatus for non-destructively testing an electrically conductive material, such as steel at a temperature above the

Curie temperature, with pulses of ultrasound, comprising first and second core means, a first coil wound on said first core means for producing a first magnetic field in the region of said material upon conduction of electrical current through the first coil, a second coil wound on said second core means for producing a second magnetic field in the region of said material upon conduction of electrical current through the second coil, circuit means electrically connected to one of said first and second coils for conducting current through said one of said first and second coils first in one direction and then in an opposite direction, said circuit means also being electrically connected to the other of said first and second coils for conducting current through said other of said first and second coils, a transmitter coil lying in said first magnetic field, means for conducting a first pulse of current through said transmitter coil to produce at least one ultrasonic pulse in said material while current is being conducted in said one direction through said one of said first and second coils and for further conducting at least a second pulse of current through said transmitter coil to produce at least one additional ultrasonic pulse in said material while current is being conducted in said opposite direction through said one of said first and second coils, a receiver coil lying in said second magnetic field for supplying a first electrical signal in response to said one ultrasonic pulse and a second electrical signal in response to said additional ultrasonic pulse, each of said first and second electrical signals varying as a function of its associated ultrasonic pulse, memory means electrically connected to said receiver coil for storing at least said first electrical signal, an electrical circuit, means for supplying said second electrical signal to said electrical circuit and also for delivering said first electrical signal from said memory means to said electrical circuit, said electrical circuit comprising means for developing an electrical output signal from the difference between said first and second electrical signals to reduce interference in said output signal due to vibration of said first and second coils and said first and second core means, and said output signal containing information for analyzing said material for defects.

4,420,979

ULTRASONIC MICROSCOPE

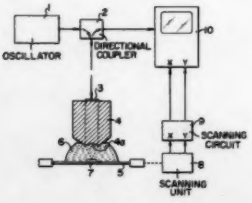
Isao Momii, Yunotani; Noriyoshi Chubachi, and Junichi Kushibiki, both of Sendai, all of Japan, assignors to Olympus Optical Company Ltd., Japan

Filed Apr. 20, 1982, Ser. No. 370,062

Claims priority, application Japan, Apr. 21, 1981, 56-59995

Int. Cl.³ G01N *29/00*

U.S. Cl. 73—644 **12 Claims**



1. An ultrasonic microscope comprising an impedance matching layer composed of a chalcogenide glass film, said layer being on a spherical lens portion of an ultrasonic condensing lens which contacts with an acoustic field medium.

4,420,980

ARRANGEMENT FOR MEASURING THE PRESSURE IN CYLINDRICAL CAVITIES

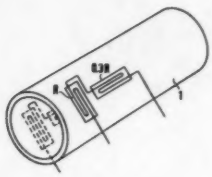
Klaus Dunemann, Karlsbad, and Harald Fritz, Waldbronn, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Sep. 30, 1981, Ser. No. 307,275

Claims priority, application Fed. Rep. of Germany, Oct. 6, 1980, 3037753

Int. Cl.³ G01L *7/04*

U.S. Cl. 73—730 **5 Claims**



1. An arrangement for measuring the pressure in a cylindrical cavity by measuring the expansion of the cylindrical cavity in the circumferential direction by means of a first electrical transducer having a predetermined sensitivity to elongation of the cylindrical cavity in the circumferential direction, the arrangement further comprising a second electrical transducer responsive to elongation of the cylindrical cavity along a longitudinal direction, said second electrical transducer having a sensitivity to said longitudinal elongation which corresponds to the product of the predetermined sensitivity of the first electrical transducer and the reciprocal value of the Poisson ratio, the first electrical transducer and said second electrical transducer being connected in series with one another.

4,420,981

MANOMETER SWITCHING VALVE

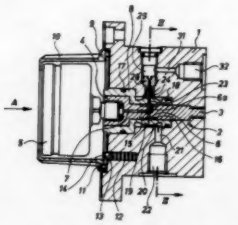
Otmar Schoen, Scheidterberg, Fed. Rep. of Germany, assignor to Flutec Fluidtechnische Geraete GmbH, Fed. Rep. of Germany

Filed May 11, 1982, Ser. No. 377,076

Claims priority, application Fed. Rep. of Germany, May 19, 1981, 3119858

Int. Cl.³ G01L *19/00*

U.S. Cl. 73—756 **6 Claims**



1. A switching valve for selectively interconnecting a manometer and each of a plurality of locations to be measured, comprising

a manometer having a measuring passage;

a first valve body mechanically coupled to said manometer;

a second valve body rotatably coupled to said first body, said second body having

a radial control bore continuously coupled to said measuring passage of said manometer, and

a spherical zone through which said control bore opens;

said first valve body having a portion surrounding said spherical zone comprising

a plurality of bores extending radially relative to said spherical zone,

a packing body in each said bore, each body having a control opening and an annular sealing surface having a greater diameter than the opening of said control bore,

means for urging each said sealing surface into contact with said spherical zone,

said spherical zone having a space between said sealing surfaces, and

means for defining a volume enclosing said spherical zone and for connecting said volume to a reservoir whereby said manometer can be coupled to said reservoir between said packing bodies.

4,420,982

UNITARY ELECTROMAGNETIC FLOWMETER WITH SEALED COILS

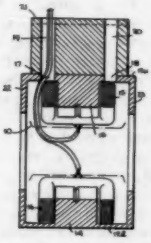
Roy F. Schmoock, Yardley, Pa., assignor to Fischer & Porter Company, Warminster, Pa.

Division of Ser. No. 174,609, Aug. 1, 1980, Pat. No. 4,358,963, which is a continuation-in-part of Ser. No. 75,037, Sep. 12, 1979, Pat. No. 4,253,340, which is a continuation-in-part of Ser. No. 811,276, Jun. 29, 1977, Pat. No. 4,181,018, which is a division of Ser. No. 771,420, Feb. 23, 1977, Pat. No. 4,098,118. This application Jul. 16, 1982, Ser. No. 398,809

The portion of the term of this patent subsequent to Nov. 16, 1999, has been disclaimed.

Int. Cl.³ G01F *1/58*

U.S. Cl. 73—861.12 **6 Claims**



1. A flangeless electromagnetic flowmeter unit interposable between the end flanges of the upstream and downstream pipes of a line conducting a fluid whose flow rate is to be metered, the end flanges of the pipes having a predetermined diameter and a circle of bolt holes, said unit comprising:

A. a cylindrical metal housing having an external diameter which is smaller than that of the circle whereby when the unit is interposed between the end flanges of the pipes, the housing lies within the circle and the flanges are bridged by bolts passing through the holes to encage the unit and subject it to a compressive force effecting a fluid seal;

B. a non-magnetic spool coaxially disposed within said housing and provided with end flanges which are seated against the ends of the upstream and downstream pipes and define with said housing an internal cavity, said spool forming a fluid conduit having a longitudinal flow axis which joins the upstream and downstream pipes, said spool having a strength sufficient to withstand the pressure of fluid flowing in the conduit and said compressive force;

C. a pair of electromagnet coils disposed at diametrically-opposed sides of said spool to create a magnetic field whose lines of flux extend across the conduit, said coils lying on a coil axis which is normal to said flow axis; and

D. a pair of electrodes mounted on said spool at diametrically-opposed positions along an electrode axis perpendicular both to the coil axis and to the flow axis whereby the fluid which flows through the conduit intersects said lines of flux to induce a signal in said electrodes which is a function of flow rate.

4,420,983

MASS FLOW MEASUREMENT DEVICE

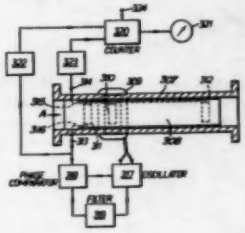
Roger M. Langdon, Colchester, England, assignor to The Marconi Company Limited, Chelmsford, England

Filed Jul. 27, 1981, Ser. No. 287,293

Claims priority, application United Kingdom, Feb. 28, 1980, 8006685; Jan. 30, 1981, 8102925; Jan. 30, 1981, 8102961; Feb. 16, 1981, 8104794

Int. Cl.³ G01F *1/78*

U.S. Cl. 73—861.18 **14 Claims**



8. A mass flow measurement device comprising means for generating a traveling flexural wave in the surface of a body, said body being in the form of a thin walled hollow cylinder having an outer cylinder surface, said cylinder being rigidly supported at at least one end, with the flexural wave being arranged to travel circumferentially around the outer surface of the cylinder, and said cylinder being mounted longitudinally within a duct; means for causing fluid to flow along said duct and over at least part of the outer surface of said cylinder; deflector means provided within said duct for imparting to the fluid a component of motion which is directed around the surface of the cylinder; and means for detecting the effect of the fluid on the wave velocity of the flexural wave, wherein the frequency of the traveling flexural wave is controlled to maintain said cylinder in resonance.

11. A mass flow measurement device comprising means for generating a travelling flexural wave in the surface of a body, said body being in the form of a thin vane rigidly clamped at one of its ends to the internal surface of a hollow tube and extending along the direction of the axis of the tube; means for causing fluid to flow over said surface, with the fluid being constrained to flow, in operation, through said tube; and means for detecting the effect of the fluid on the wave velocity of the flexural wave, wherein the frequency of the traveling flexural wave is controlled to maintain said vane in resonance.

4,420,984

STRING-TYPE MEASUREMENT CELL

Hans R. Zulliger, Feldmeilen, Switzerland, assignor to Mettler Instrumente A.G., Greifensee, Switzerland

Filed Dec. 9, 1981, Ser. No. 310,978

Claims priority, application Switzerland, Dec. 16, 1980, 9254/80

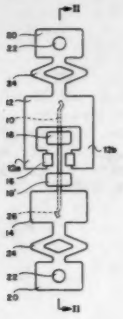
Int. Cl.³ G01L *1/10*

U.S. Cl. 73—862.59 **10 Claims**

1. A measuring cell adapted for use in a string-type instru-

ment for measuring force, pressure, distance or the like, comprising

(a) a metallic measuring string (10); and



(b) a plurality of cast nodal masses (18) each of which is cast in secured relation to said string at nodal points spaced from the ends of said string, respectively.

4,420,985

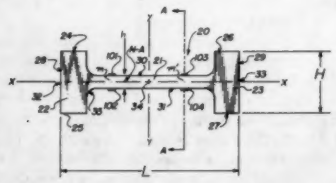
FORCE MEASUREMENT DEVICE

Seymour H. Raskin, 7333 Rustic Valley Dr., Dallas, Tex. 75248

Division of Ser. No. 37,133, May 8, 1979, abandoned. This application Oct. 31, 1980, Ser. No. 202,460

Int. Cl.³ G01L *1/22*

U.S. Cl. 73—862.66 **6 Claims**



1. A force measurement device wherein a tension strain gage and compression strain gage are secured to a beam, and tension and compression strain gages being connected in a Wheatstone bridge circuit, the improvement comprising: rigid flange portions on each end of the beam, said flange portions extending symmetrically from the neutral axis in a direction perpendicular to the neutral axis of the beam; and means symmetrically supporting the beam through the rigid flange portions about the neutral axis on one end of the beam from locations symmetrically spaced from the neutral axis of the beam a distance greater than the distance the strain gages are spaced from the neutral axis such that when force is applied to the other rigid flange portion an output signal from the Wheatstone bridge circuit is related to the magnitude of force applied to the rigid flange portion.

4,420,986

SLIDING SHOE FOR A ROTATABLE SWASH-PLATE TYPE REFRIGERANT GAS COMPRESSOR

Shozo Nakayama; Kimio Kato, both of Kariya; Tusneo Sugiura, Hekinan; Yoshio Kato, Toyota; Mikio Shugiura, Okazaki, and Keiichiro Otu, Toyota, all of Japan, assignors to K. K. Toyoda Jidoshokki Seisakusho and Taibou Kogyo Kabushiki Kaisha, both of Tokyo, Japan

Continuation of Ser. No. 953,917, Oct. 23, 1978, abandoned. This application Feb. 4, 1981, Ser. No. 231,461

Claims priority, application Japan, Nov. 1, 1977, 52-130979; Nov. 1, 1977, 52-146487[U]; Nov. 1, 1977, 52-146488[U]

Int. Cl.³ F16H *23/00*

U.S. Cl. 74—60 **10 Claims**

1. In a sliding shoe for a rotatable swash-plate type refrigerant gas compressor, in which said shoe is slidably connected between a swash-plate secured to a rotatable shaft at a predetermined inclined angle thereto and a ball rotatably engaged with a piston which effects compression of refrigerant gas by means of rotation to the swash-plate, the improvement wherein said shoe has a configuration substantially in the form of a circular disc having a swash-plate engaging surface with a major portion of said surface including a sliding plane for slidably engaging the sliding surface of the swash-plate, said shoe having a lubrication-enhancing surface slightly inclined with respect to the sliding plane within a predetermined distance from the outer periphery of the shoe, so that the cross section of the shoe, through a plane including the axis thereof, is chamfered in a substantially triangular shape having a predetermined angle between the lubrication-enhancing surface and the sliding plane, in such a way that the height H, the width L and the angle α of the chamfered portion are more than 5μ, from 0.5 to 2 mm and less than 10°, respectively.

2. In a sliding shoe for a rotatable swash-plate type refrigerant gas compressor, in which said shoe is slidably connected between a swash-plate secured to a rotatable shaft at a predetermined inclined angle thereto and a ball rotatably engaged with a piston which effects compression of refrigerant gas by means of rotation of the swash-plate, the improvement wherein said shoe has a configuration substantially in the form of a circular disc having a swash-plate engaging surface with a major portion of said surface including a sliding plane for slidably engaging the sliding surface of the swash-plate, the outer periphery of the sliding plane of the shoe facing the swash-plate is chamfered and at least said sliding plane of the shoe is coated with a lead alloy, in such a way that the height H, the width L and the angle α of the chamfered portion are more than 5μ, from 0.5 to 2 mm and less than 10°, respectively, and the thickness of the lead alloy coating is 3 to 15μ.

4,420,987

RECIRCULATING BALL DISC ACTUATOR

Theodore A. Heinz, Simi Valley, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

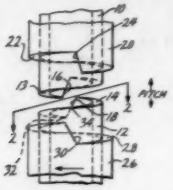
Filed Mar. 17, 1981, Ser. No. 244,550

Int. Cl.³ F16H *25/18, 25/22*

U.S. Cl. 74—99 A **12 Claims**

1. A linear actuator for moving a load along an axis comprising first and second thrust members journaled for relative rotation about said axis and movable relative to each other along said axis, the thrust members having opposing surfaces substantially transverse to said axis, each of said surfaces having at least one pair of concentric grooves forming circular ball-races coaxial with said axes, each race lying directly oppo-

site a mating race on the opposing surface, a plurality of balls positioned between the opposing surfaces and spaced around the circumferences of the pairs of mating races, at least some of the balls engaging mating races on the opposing surfaces when the thrust members are urged toward each other along said



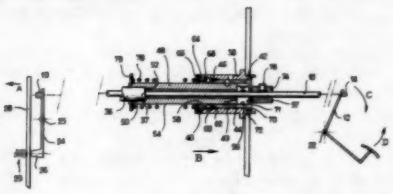
axis, the bottom of the grooves forming the mating races being formed as an axially extending helix around substantially their full circumference with the ends of the helix being joined by a step, and means for rotating one thrust member relative to the other thrust member.

4,420,988

MECHANICAL CONTROL ARRANGEMENT BY A CABLE WHICH IS SLIDEABLE AXIALLY IN A FLEXIBLE SHEATH

Jean Deligny, Epinay sur Seine, France, assignor to Societe Anonyme D.B.A., Paris, France

Filed Nov. 28, 1980, Ser. No. 211,008
Claims priority, application France, Dec. 7, 1979, 79 30097
Int. Cl.³ F16C *1/22*
U.S. Cl. 74—501.5 R **10 Claims**



1. A mechanical actuating mechanism including a cable axially slidable in a flexible sheath, said cable having one end connected to a receiving member to be actuated and its other end connected to an actuating member, said flexible sheath having one end adjacent said one end of said cable anchored to a fixed support structure and its other end adjacent said other end of said cable axially slidably received in a stationary tubular support member, from which extend said one end of said cable, spring biased releasable blocking means interposed between said other end of said sheath and said stationary support member for momentarily blocking axial movement of said other end of said sheath with respect to said stationary support member upon actuation of said cable, and control means coupled adjacent to said other end of said cable for releasing said blocking means against the biasing force of said spring when said cable is not actuated.

4,420,989

ADJUSTABLE SHOCK ABSORBING HANDLEBAR STRUCTURE

Louis J. Finkle, 3300 E. 59th St., Long Beach, Calif. 90805

Filed Jul. 6, 1981, Ser. No. 280,281
Int. Cl.³ B62K *21/14*
U.S. Cl. 74—551.2 **5 Claims**

1. In combination with a motorcycle that has a frame that pivotally supports a forked forward front wheel supporting structure having an upper extremity, an adjustable shock absorbing handlebar structure that includes:

a. a rigid plate secured to said upper extremity;

b. a rigid frame secured to said plate and extending upwardly therefrom, said frame including first and second end pieces and an upper cross piece;

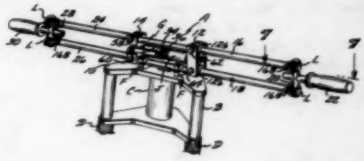
c. first upper and lower cross bars pivotally connected to said first end piece and second upper and lower cross bars pivotally connected to said second end piece, said cross bars having outer ends, said first and second cross bars extending from said frame in opposite directions;

d. first and second supports pivotally connected to said outer ends of said first upper and lower cross bars and said outer ends of said second upper and lower cross bars;

e. first and second grips extending outwardly in opposite directions from said first and second supports;

f. a rod that extends between said first and second end pieces;

g. first and second tubular resilient pads mounted in longitudinally spaced relationship on said rod, each of said pads



having first and second end surfaces, and said first end surfaces adjacently disposed;

h. rigid first means slidably mounted on said rod and in abutting contact with said first end surfaces;

i. first and second linkage means pivotally connected to said rigid means and to said first upper cross bar and to said lower cross bar, and said first and second resilient pads, said rigid means, and said first and second linkage means cooperating to maintain said first upper and lower cross bars and second upper and lower cross bars at a first position relative to said frame; and

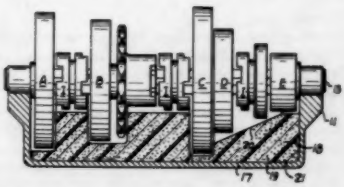
j. second and third means mounted on said rod and in abutting contact with said second end surfaces, with at least said second means being in abutting contact with said second end surface of said second resilient pad, with said second means when moved longitudinally relative to said rod varying the degree of compression on said first and second resilient pads and the degree of shock that will be transmitted from said motorcycle to said grips.

4,420,990

TRANSMISSION FILLER

Hans Hauser, Chippewa Lake, Ohio, assignor to MTD Products Inc., Cleveland, Ohio

Filed Oct. 2, 1981, Ser. No. 307,810
Int. Cl.³ F16H *57/02, 57/04*
U.S. Cl. 74—606 R **15 Claims**



2. A filler for a transmission having a lower half of a housing and at least one pair of intermeshing gears spaced from the

housing, the housing being adapted to contain lubricant for lubricating said gears, the gears having lower portions with contours, said filler comprising a body in fixed form of a material having low lubricating quality relative to said lubricant, said body being positioned between the housing and the gears, said body having a top surface and a bottom surface, said top surface of said body having cavities formed to contain the lower portions of the gears, said cavities generally following the contours of the lower portions of the gears a spaced distance therefrom to clear the gears and said bottom surface of said body engaging the lower half of the housing, said body occupying a major portion of the open space between the lower portions of the gears and the lower half of the housing and thus reducing the amount of lubricant necessary to lubricate the gears.

4,420,991

DRIVE SYSTEM FOR TRACK-LAYING VEHICLE

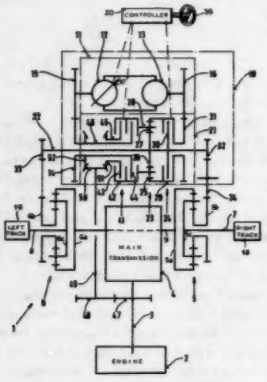
Michael Meyerle, Meckenbeuren, Fed. Rep. of Germany, assignor to Zahnradfabrik Friedrichshafen, AG, Friedrichshafen, Fed. Rep. of Germany

Filed Mar. 26, 1981, Ser. No. 247,855

Claims priority, application Fed. Rep. of Germany, Mar. 28, 1980, 3012220

Int. Cl.³ F16H *37/06*

U.S. Cl. 74—682 **10 Claims**



1. A drive system for a track-laying vehicle, said system comprising:

a main drive shaft connectable to an engine;

right and left summing transmissions having primary inputs operatively connected to said shaft, secondary inputs, and outputs connected respectively to right and left tracks;

a compensating shaft;

means operatively connecting said compensating shaft to said secondary inputs of said summing transmissions for rotation of one of said secondary inputs in one direction and rotation of the other secondary input in the opposite direction on rotation of said compensating shaft in one direction and vice versa;

a planetary-gear transmission having a pair of separate inputs and an output connected to said compensating shaft;

a hydraulic machine operatively connected to and driven by said main drive shaft;

another hydraulic machine connected to and drivable by the first-mentioned machine and having an output connected to one of said inputs of said planetary-gear transmission, one of said machines having a control element and being of variable volume and the other machine being of constant volume, whereby said machines form a variable-ratio hydrostatic transmission;

a first clutch having one side connected to said output of said other hydraulic machine and to said one input of said planetary-gear transmission and another side connected to said compensating shaft; and

a second clutch having one side connected to the other input of said planetary-gear transmission and another side operatively connected to said main drive shaft.

4,420,992

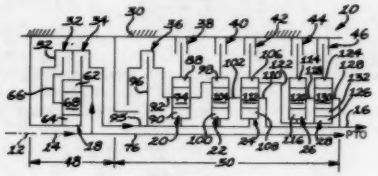
PLANETARY TRANSMISSION

Willis E. Windish, Pekin, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jul. 7, 1981, Ser. No. 288,953

Int. Cl.³ F16H *3/44, 57/10, 37/00*

U.S. Cl. 74—781 R **18 Claims**



1. A planetary transmission (10) comprising:

a front section (48) having a rotating housing (52) and a planetary gear set (18) including a ring gear (62), a sun gear (64) and a planet carrier (66), the ring gear (62) serving as the input and the rotating housing (52) serving as the output;

holding means (69) for holding the sun gear (64) stationary;

first clutch means (32) for selectively connecting the planet carrier (66) to the rotating housing (52) and providing underdrive; and

second clutch means (34) for selectively connecting the ring gear (62) to the rotating housing (52) and providing direct drive.

4,420,993

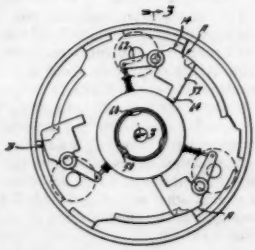
SHIFT INHIBITOR ASSEMBLY

Stewart J. Woodcock, Fayetteville, N.Y., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Jun. 29, 1981, Ser. No. 278,805

Int. Cl.³ F16H *57/06;* **F16D** *13/60*

U.S. Cl. 74—785 **1 Claim**



1. In a power transmission having a housing, an input shaft, an output shaft, and a planetary gear assembly disposed operatively therebetween, the planetary gear assembly including a sun gear in driven relationship with the input shaft, and a sub-assembly, said sub-assembly having a carrier, a ring gear, and planet gear means in meshing relationship with the sun and ring gears, said sub-assembly being shiftable relative to said sun gear along said output shaft for effecting gear ratio changes,

the improvement comprising shift inhibitor means operatively associated with said gear assembly for preventing axial movement of said gear sub-assembly when said output shaft is rotating at a speed above a predetermined speed; said shift inhibitor means including a plurality of speed responsive flyweight actuator members mounted for rotation with said carrier; means defining a plurality of axially spaced sets of axially aligned pockets in the outer periphery of said output shaft; means defining an axially extending hub portion of said carrier having a plurality of radially extending bores formed therethrough; each said actuator members pivotally mounted on said carrier for reciprocal movement with respect thereto at a position spaced radially outwardly from said hub portion; and a plurality of radially extending actuating rod members, each rod member pivotally connected to one of an associated actuator members for movement therewith in response to centrifugal force exerted on its actuator member, each said rod member including a cylindrical plug portion insertable through an associated one of the carrier member bores to engage a pocket when the speed of said output shaft exceeds said predetermined speed, a plurality of biasing helical compression springs, each said spring oriented on the radial axis of its associated rod member, each said spring engaged between a portion of its associated rod member and said hub portion for continuously biasing said actuator member radially outwardly, thereby insuring disengagement of said plug portions from said pockets at speeds below said predetermined speed.

4,420,994

HYDRAULIC REGULATING DEVICE FOR LOAD OPERATED GEAR SHIFT SYSTEMS

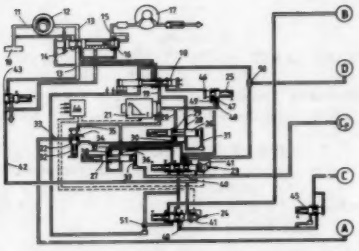
Alfred Müller, Leonberg, and Joseph Sauer, Schwieberdingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Oct. 23, 1980, Ser. No. 199,918

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1979, 2947897

Int. Cl.³ B60K *41/04*

U.S. Cl. 74—867 **14 Claims**



1. A hydraulic regulating device for a load operated gear shift system, particularly for an automatic transmission in motor vehicles including a plurality of hydraulic coupling elements, a source of pressure fluid, a return conduit, a high pressure conduit connected to the source, a manually operable hydraulic selector valve for preselecting a gear stage, a working pressure conduit connected via the selector valve to the high pressure conduit, and a plurality of shift control valves assigned to respective coupling elements, the device comprising a single pressure regulating valve having an input and an output; said working pressure conduit being connected to the input of said pressure regulating valve; a shift pressure conduit connected to the output of the pressure regulating valve; a plurality of holding valves connected between said working pressure conduit and said shift pressure conduit; said shift control valves being connected to said shift pressure conduit and cooperating with said holding valves to connect, in response to an increased gear speed in the preselected gear stage the coupling elements pertaining to a higher gear in the preselected gear stage to said shift pressure conduit and after the gear shift operation is completed, to connect via said working pressure conduit the latter coupling elements with the exception of the last connected coupling element, to said high pressure conduit while the last connected coupling element remains connected to said shift pressure conduit.

4,420,995

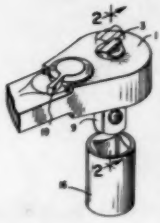
QUICK-RELEASE AND POSITIVE LOCKING MECHANISM FOR USE ON SOCKET WRENCHES AND ON POWER AND IMPACT TOOLS

Peter M. Roberts, P.O. Box 15762, Red Bank, Tenn. 37415

Filed Jun. 5, 1981, Ser. No. 270,733

Int. Cl.³ B25B *13/46*

U.S. Cl. 81—60 **13 Claims**



1. In a tool for receiving a removable tool attachment, a handle, a head mounted thereon, a drive stud secured to the head of the tool for receiving said removable tool attachment, said drive stud having a longitudinal passage for receiving an elongate slidable and rotatable pin, said drive stud further having an aperture for receiving a ball detent, said aperture securing the ball detent to the drive stud, said ball detent being normally in contact with the surface of the pin so that the detent extends outward of the drive stud and engages a recess in said tool attachment to securely hold said tool attachment to the drive stud, said elongate pin having two recesses and a passage between said recesses, a first recess for receiving the ball detent by selective longitudinal alignment of the pin, in which first recess the ball detent retracts thereby releasing the tool attachment, and a second recess for receiving the ball detent by selective rotation of the pin such that during rotation the ball detent travels from the first recess through said passage between the recesses to the second recess, the depth of said second recess being such that the ball detent is maintained in an outward position, and the width of said second recess being such that the tool attachment is securely locked to the drive stud essentially precluding substantial movement of the ball detent.

4,420,996

SLITTER INDEXING SYSTEM

Robert Greding, Beaconsfield, and Rodney H. Bryce, Lachine, both of Canada, assignors to Canadian General Electric Company Limited, Toronto, Canada

Filed Jan. 19, 1982, Ser. No. 340,731

Claims priority, application Canada, Jan. 23, 1981, 369244

Int. Cl.³ B26D *1/24, 7/26*

U.S. Cl. 83—13 **12 Claims**

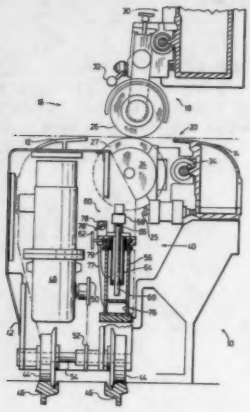
12. The method of operating a slitting machine for slitting an endless wide web, said machine having a plurality of mutually spaced apart slitting means normally inaccessible during operation of the machine when slitting a web, comprising the steps of;

providing a plurality of individually adjustable slitter indexing means, one for each said slitting means, mounted on traverse means storable within the slitting machine and

withdrawable therefrom during continuing operation of the machine;

withdrawing the traverse means to a position providing access to the indexing means;

adjusting the respective positions of at least selected ones of



the indexing means along the length of the traverse means relative to a predetermined datum;

re-inserting the traverse means within the machine in predetermined spaced related therewith, and resetting the slitting means to the indexing means when the machine in inoperative.

4,420,997

APPARATUS FOR PORTIONING MEAT

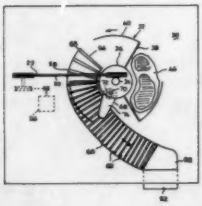
John A. Whitehouse, Norwich, England, assignor to AEW Engineering Co. Limited, Norwich, England

Filed Aug. 31, 1981, Ser. No. 297,747

Claims priority, application United Kingdom, Sep. 4, 1980, 8028634; May 20, 1981, 8115516

Int. Cl.³ B26D *7/06*

U.S. Cl. 83—105 **11 Claims**



1. Apparatus for portioning meat, comprising a bandsaw having a generally horizontal cutting flight, a meat holder, driving means for moving said meat holder, thereby in use to move the meat to be portioned in a path intersecting the cutting flight at a cutting station, a depth stop below the cutting flight for supporting such meat during its movement through the cutting station, means for moving said depth stop in a path of movement through the cutting station which corresponds to the path of movement of the meat being moved by the meat holder, means for substatially synchronizing said two movements, and separating means at a separating station downstream of the cutting station for separating a cut portion of meat for transport on the depth stop from a remaining portion of meat retained by the meat holder.

4,420,998

DIE CUTTER AND DIE-CUTTING PROCESS

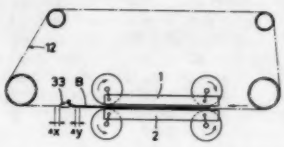
Masateru Tokuno, Nishinomiya, and Tetsuya Sawada, Kyoto, both of Japan, assignors to Rengo Co., Ltd., Osaka, Japan

Filed Apr. 26, 1982, Ser. No. 372,240

Claims priority, application Japan, May 29, 1981, 56-84047

Int. Cl.³ B26D *1/58*

U.S. Cl. 83—328 **4 Claims**



1. A die cutter for die-cutting blanks supplied one after another into a desired shape, said die cutter comprising a cutting means having a blade and an anvil opposed to each other with said blanks supplied to therebetween and link and transmission means for driving said blade and said anvil interlocked with each other in such a manner that they will contact each other at a point moving from one end thereof to the other, said anvil having a surface facing to the blade shaped to be convex; and a blank feed means having a pair of endless conveyors provided one at each side of the die cutter, and a plurality of blank support units transversely mounted on and between said conveyors for feeding said blanks through said cutting means, characterised in that said blanks are supported for a limited amount of movement with respect to said blank feed means so that during the die-cutting said blanks will be fed by their engagement with said blade and said anvil, not by said blank feed means.

4,420,999

ROTARY PLATE-SHAPE MATERIAL CUTTING ARRANGEMENT

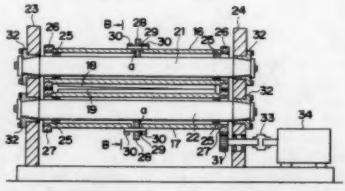
Tadashi Hirakawa; Toshiaki Kusubayashi, and Yukio Oku, all of Mihara, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Japan

Filed Feb. 18, 1982, Ser. No. 349,970

Claims priority, application Japan, Feb. 23, 1981, 56-24230

Int. Cl.³ B26D *1/62*

U.S. Cl. 83—345 **1 Claim**



1. A rotary plate-shaped material cutting apparatus which comprises a pair of hollow knife cylinders, each provided with a cutting knife and adapted to rotate in mutally opposite directions, shafts piercing the hollow portion of the knife cylinders and having both ends thereof supported by frames, bearings positioned at both ends of the knife cylinders and interposed between the shafts and knife cylinders and at least one roll provided at each of the knife cylinders, rotatably supported

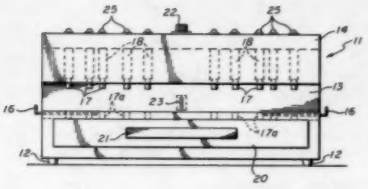
therein and having its rotary surface kept in contact with the external circumference of the shafts.

4,421,000

HOLE PUNCHING DEVICE

Ina H. Murphy, 5610 Minden, Houston, Tex. 77026

Filed May 15, 1981, Ser. No. 263,932
Int. Cl.³ B26F *1/04*
U.S. Cl. 83—372 **2 Claims**



1. An improved electrically powered paper hole punching device, comprising:

(a) a housing, having a front surface, and including a removable tray mounted on a bottom surface thereof;

(b) a plurality of linearly aligned punches mounted within the housing, said punches spaced in accordance with hole spacing requirements of loose leaf binders;

(c) a plurality of electrically powered actuator means, each actuator means connected to one punch;

(d) selection means for simultaneously selecting one or more of the punches for inclusion in an electric circuit;

(e) guide means mounted on the housing for positioning the paper in relation to the front surface of the housing and the punches;

(f) a first switch means mounted in the housing for detecting the presence of paper in position with respect to the housing and the punches;

(g) an electric circuit connecting those punches and actuators selected with the first switch means and the selection means whereby the insertion of paper into the housing will close the first switch means so as to complete the electric circuit and to activate the punches thereby forming holes in the paper;

(h) actuator means comprised of a solenoid, the shaft of said solenoid being axially aligned with and affixed to said punch; and,

(i) electrical indicator means for signaling which punches and actuator means have been included in the electric circuit.

4,421,001

FULL NOTE GENERATOR SYSTEM FOR AN ELECTRONIC ORGAN

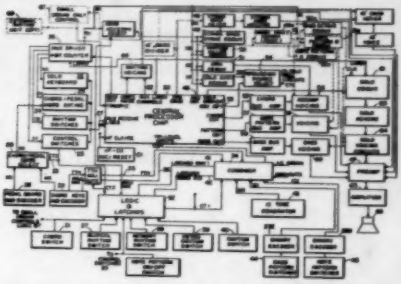
Brian N. Wilcox, Kettering, Ohio, and John W. Robinson, Jasper, Ind., assignors to Kimball International, Inc., Jasper, Ind.

Division of Ser. No. 234,001, Feb. 12, 1981, Pat. No. 4,361,065, which is a continuation of Ser. No. 962,400, Nov. 20, 1978, abandoned. This application Feb. 26, 1981, Ser. No. 238,481
Int. Cl.³ G10H *1/38, 7/00*
U.S. Cl. 84—1.17 **5 Claims**

1. In an electronic organ including keyboard means having playing keys for calling forth respective tones and comprising a solo portion and an accompaniment portion, clock means for producing a train of clock pulses, multiplexer means for scanning at least said solo portion of said keyboard means in synchronism with said clock means and generating a data stream on each scan of the keyboard containing keydown signals in respective time slots for each depressed key in the solo manual, and solo chord generating means operable in response to an initiating keydown signal in said data stream and the depression of a key in the accompaniment portion for supplying at least one keydown signal to said data stream in a fill note time slot different from the time slot pertaining to the respective keydown signal, said fill note time slot corresponding to a key octavely related to a key corresponding to the tone called forth by the depressed accompaniment key, the improvement in said solo chord generating means comprising:

a multistage first shift register clocked in synchronism with the scanning of said keyboard, said shift register having an output feeding into said data stream and having respective inputs for at least some of its stages,

a multistage second shift register clocked in synchronism with the scanning of said keyboard means, each of said stages having an output line,



means synchronized with the scanning of said keyboard and responsive to the depression of a key in the accompaniment manual for loading a data bit in said second shift register, and

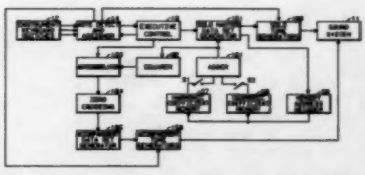
memory means having a plurality of input lines connected respectively to said second shift register output lines, and a plurality of output lines connected respectively to the stages of said first shift register inputs, said memory means having address points sequentially addressed by said second shift register over said memory input lines and loadng a data bit into at least one stage of said first shift register when said intiating keydown signal appears in said data stream.

4,421,002

ADAPTIVE ACCOMPANIMENT TONE COLOR FOR AN ELECTRONIC MUSICAL INSTRUMENT

Ralph Deutsch, Sherman Oaks, Calif., assignor to Kawai Musical Instrument Mfg. Co., Ltd., Hamamatsu, Japan

Filed Jan. 29, 1982, Ser. No. 344,093
Int. Cl.³ G10H *1/36, 7/00*
U.S. Cl. 84—1.17 **10 Claims**



1. In a keyboard musical instrument having a solo keyboard comprising a solo linear array of keyswitches and having an accompaniment keyboard comprising an accompaniment linear array of keyswitches wherein a number of solo tone generators associated with said solo keyboard produce musical waveshapes from a solo master data set having a plurality of data words defining the waveform of a solo musical tone are computed and transferred sequentially to a digital-to-analog converter to be converted into musical waveshapes and

wherein a number of accompaniment tone generators associated with said accompaniment keyboard produce musical waveshapes from an accompaniment master data set having a plurality of data words defining the waveform of an accompaniment musical tone are computed and transferred sequentially to a digital-to-analog converter to be converted into musical waveshapes, apparatus for generating accompaniment musical tones which complement a selected solo musical tone comprising:

a coefficient memory for storing a set of solo harmonic coefficient values,

a harmonic coefficient addressing means for reading out solo harmonic coefficient values from said coefficient memory,

a first means for computing, responsive to solo harmonic coefficient values read out from said coefficient memory, whereby said selected solo master data set comprising a plurality of data points defining a solo musical tone is computed,

a solo means for producing said selected solo musical tones from said solo master data set in response to keyswitches actuated in said solo linear array of keyswitches,

a second means for computing, responsive to said solo harmonic coefficient values read out from said coefficient memory, whereby a set of autocorrelation function data values are computed,

a third means for computing, responsive to said set of autocorrelation function data values, whereby a set of accompaniment harmonic coefficient values are computed,

a fourth means for computing, responsive to said set of accompaniment harmonic coefficient values, whereby said accompaniment master data set comprising a plurality of data points defining an accompaniment musical tone is computed, and

an accompaniment means for producing said accompaniment musical tones in response to keyswitches actuated in said accompaniment linear array of keyswitches, which complement said selected solo musical tones, from said accompaniment master data set.

4,421,003

ENVELOPE GENERATOR FOR ELECTRONIC MUSICAL INSTRUMENTS

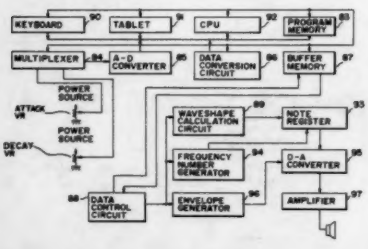
Tatsunori Kondo, Iwata, Japan, assignor to Kabushiki Kaisha Kawai Gakki Seisakusho, Japan

Filed Nov. 25, 1981, Ser. No. 324,848

Claims priority, application Japan, Nov. 25, 1980, 55-165721; Apr. 30, 1981, 56-65710; May 12, 1981, 56-71173; May 30, 1981, 56-83006

Int. Cl.³ G10H *1/02*

U.S. Cl. 84—1.26 **15 Claims**



1. An envelope generator for electronic musical instruments which generates an envelope of a musical note by a calculation of predetermined timing, comprising:

tablet switch means for selecting a tone type,

variable resistor means for setting attack and decay rate data;

control information generating means for generating control information responsive to either or both of said tablet switch means and said variable resistor means;

first memory means for storing speed parameters of the envelope which are determined corresponding to the speeds of attack, decay and release of the envelope to be generated in response to a key depression;

second memory means for storing a signal for determining which to control of a rise and a fall time of a sound to be produced;

first readout means responsive to said signal from said second memory means and said control information generating means, for reading out a speed parameter from said first memory means; and

calculating means for calculating an envelope waveshape based on the speed parameter readout by said first readout means.

4,421,004

METHOD AND A DEVICE FOR CAST-LOADING EXPLOSIVE CHARGES

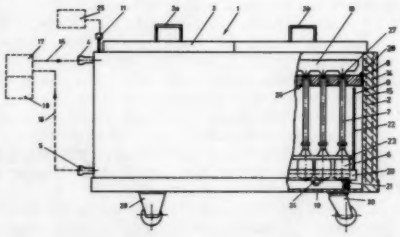
Stig Hallström, and Lars Hörman, both of Karlskoga, Sweden, assignors to Aktiebolaget Bofors, Bofors, Sweden

Filed Jan. 15, 1982, Ser. No. 339,589

Claims priority, application Sweden, Jan. 19, 1981, 8100253

Int. Cl.³ C06D *1/08*

U.S. Cl. 86—20 D **9 Claims**



1. A method for cast loading an explosive charge composition of the type including liquid and solid sedimentary components comprising:

vertically positioning a plurality of shell bodies within a wheel supported enclosure for receiving said explosive charge composition;

preheating the interior of said enclosure with heating channels within said enclosure to maintain said shell bodies at a pre-established temperature for maintaining said charge composition in a liquid state;

filling said plurality of shell bodies with said charge composition of liquid and solid components while maintaining said shell bodies at said predetermined temperature;

vibrating said filled shell bodies at a predetermined frequency while maintaining said predetermined temperature whereby heavy particles of said explosive charge composition sink to the lower portions of said shell bodies; and

moving said enclosure to a cooling station and thence cooling said shell bodies until said composition assumes a solid state.

4,421,005

EXPLOSIVE ACTUATED VALVE

Kenneth G. Byrne, Livermore, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

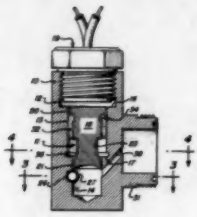
Filed Mar. 28, 1962, Ser. No. 183,706

Int. Cl.³ F16K *17/00*

U.S. Cl. 89—1 B **4 Claims**

1. A device of the character described comprising the combination of a housing having an elongate bore and including a shoulder extending inwardly into said bore, a single elongate movable plunger disposed in said bore including an outwardly

extending flange adjacent one end thereof overlying said shoulder, normally open conduit means having an inlet and an outlet perpendicularly piercing said housing intermediate said shoulder and said flange and including an intermediate portion intersecting and normally openly communicating with said bore at said shoulder, normally closed conduit means piercing said housing and intersecting said bore at a location spaced from said normally open conduit means, said elongate plunger including a shearing edge adjacent the other end thereof normally disposed intermediate both of said conduit means and overlying a portion of said normally closed conduit means, a



deformable member carried by said plunger intermediate said flange and said shoulder and normally spaced from and overlying the intermediate portion of said normally open conduit means, and means on the housing communicating with the bore to retain an explosive actuator for moving said plunger to force the deformable member against the shoulder and extrude a portion of the deformable member out of said bore into portions of the normally open conduit means for plugging the same and to effect the opening of said normally closed conduit means by the plunger shearing edge substantially concomitantly with the plugging of the normally open conduit means.

4,421,006

MANUAL COCKING DEVICE FOR AN AUTOMATIC FIRING WEAPON

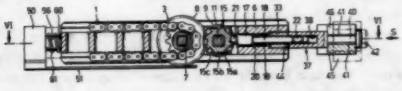
Willi Kocher, Zurich, and Jakob Zimmermann, Pfäffikon, both of Switzerland, assignors to Werkzeugmaschinenfabrik Oerlikon-Bürle AG, Zurich, Switzerland

Filed Nov. 30, 1981, Ser. No. 325,906

Claims priority, application Switzerland, Dec. 18, 1980, 9341/80

Int. Cl.³ F41D *11/00*; F41F *19/16*

U.S. Cl. 89—1 K **5 Claims**



1. A manual cocking device for an automatic firing weapon, comprising:

a movable entrainment element for retracting a weapon breechblock against the force of a forward advancing means thereof;

a cocking chain for displacing said movable entrainment element;

a sprocket wheel engaging with said cocking chain;

a drive shaft operatively connected to said sprocket wheel;

said drive shaft being capable of actuation by a removable handcrank which drives said drive shaft;

a locking wheel mounted upon said drive shaft;

a spring-loaded locking bolt operatively associated with said locking wheel for blocking the same in one predetermined direction of rotation;

a safety bolt for axially securing said handcrank to said drive shaft; and

common holder means for disengaging said locking bolt and said safety bolt from said locking wheel and said handcrank, respectively.

4,421,007

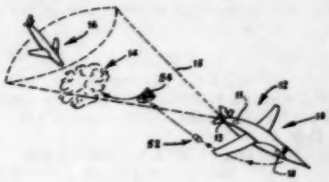
AIR BOMB SYSTEM

Norris H. Hanes, Jr., 192 White Birch Dr., Pease AFB, N.H. 03801

Filed Dec. 10, 1981, Ser. No. 329,445

Int. Cl.³ F41F *5/02*; B64D *1/04*

U.S. Cl. 89—1 A **8 Claims**



1. An air bomb system for an aircraft for the defense of said aircraft from a rearward attacking aircraft comprising:

means within said defending aircraft for determining dynamic motion variables of said attacking aircraft;

means within said defending aircraft for computing a time-delay detonation period and a time for dispensing bombs from said defending aircraft based upon the dynamic motion variables of said dynamic motion variable determining means, and for providing signals in accordance therewith; and

means located on said defending aircraft for dispensing bombs from said defending aircraft in response to said signals from said computing means whereby dispensed bombs explode in the path of or vicinity of said attacking aircraft.

4,421,008

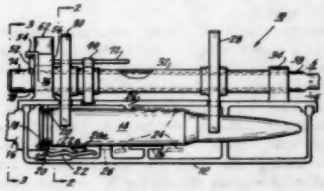
TIMED ROUND STOP FOR A SPROCKET FED WEAPON

George E. Kontis, South Burlington, and Sherwood P. Evans, Burlington, both of Vt., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 27, 1981, Ser. No. 296,738

Int. Cl.³ F41D *10/06*

U.S. Cl. 89—33 CA **9 Claims**



1. A timed round stop for a sprocket fed weapon, said round stop comprising:

feed means for sequentially feeding rounds along a feed path to a feed transfer position in a weapon for chambering of the rounds for firing;

pivoting round stop means having a first round stop position in which it blocks said feed path and a second round stop position in which it is remote from said feed path to allow movement of rounds therealong to said feed transfer position; and said round stop means having a first condition in

which it is held in said first round stop position for preventing movement of a round past it along said feed path to said feed transfer position, and said round stop means having a second condition in which it is freely pivotable between said first and second round stop positions;

control means for placing said round stop means alternately in said first condition and in said second condition with a predetermined timing;

a control surface and wherein said control means comprises ratchet means having tooth means adapted to engage said control surface to place said round stop means in said first condition; and

feed sprocket means having a number of teeth equal to the number of said tooth means of said ratchet means;

wherein said feed sprocket means and said ratchet means are mounted for rotation at the same rate about the same axis.

4,421,009

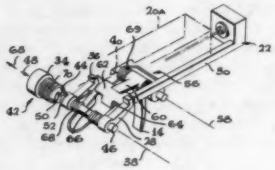
REPEATING FIREARM

Thomas P. Castellano, 2738 Westwood Blvd., Los Angeles, Calif. 90064, and Nathan Mandel, 20283 Lorenzana Ave., Woodland Hills, Calif. 91364

Filed Oct. 15, 1982, Ser. No. 434,564

Int. Cl.³ F41D *11/02*

U.S. Cl. 89—140 **10 Claims**



1. A repeating firearm, comprising:

a gun frame with front and rear ends;

a gun barrel mounted on said frame;

a bolt moveable in predetermined longitudinal directions in said frame, including a forward longitudinal direction to chamber a cartridge at the rear of the barrel, and a rearward direction;

a firing pin device moveable forwardly in said frame to fire a chambered cartridge, and moveable rearwardly;

a trigger assembly mounted on said frame, including a trigger moveable by a person and a sear mechanism coupled to said trigger to control release of said firing pin device; and

auto control means for controlling operation of said sear mechanism selectively in full automatic and semiautomatic modes;

said auto control means including a manually moveable auto control member which is accessible from outside said frame, a spring coupled to said member and urging said member toward a predetermined semiautomatic operating position while allowing it to be moved to a predetermined full automatic position, and coupling means for coupling said control member to said sear mechanism for repeatedly releasing said firing pin device for full automatic operation as long as the trigger is depressed when said control member is in said full automatic position, and for only singularly releasing said firing pin each time said trigger is depressed to operate in the semiautomatic mode when said control member is in said semiautomatic mode;

said auto control member being depressable to said full automatic position by the hand of a person operating the firearm and being extended by said spring to said semiautomatic position when not depressed, whereby the operator has to remember only to apply depressing forces to switch to the full automatic mode operation in the confusion of battle.

4,421,010

STEERING GEAR FOR MOTOR VEHICLES

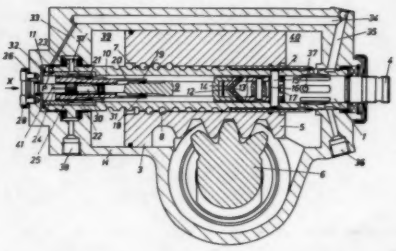
Dieter Elser, Essingen, Fed. Rep. of Germany, assignor to Zahnradfabrik Friedrichshafen, AG., Friedrichshafen, Fed. Rep. of Germany

Filed Jul. 15, 1981, Ser. No. 283,456

Claims priority, application Fed. Rep. of Germany, Jul. 25, 1980, 3028175

Int. Cl.³ F15B *9/10*

U.S. Cl. 91—375 R **18 Claims**



1. In a booster steering system including a housing H, a double acting servomotor in said housing and a flow control valve in said housing having relatively rotatable valve members (1 and 2) with coacting passages for operating said servomotor, a neutral return mechanism comprising relatively rotative cam members (12, 13), one of the cam members (13) being secured to one of said valve members (1), neutral return biasing means (9) secured to the other of the cam members (12) for biasing said cam members to center said valve members in a neutral position, wherein relative rotation between said cam members stores energy for return of said valve members to the neutral position in response to relative rotation between said valve members causing relative rotation of said cam members;

the improvement residing in said neutral return mechanism including:

an outer coupling sleeve (11) secured to said other of the valve members (2);

an inner coupling sleeve (10) within said outer sleeve;

a threaded connection (25) between said inner coupling sleeve and said housing and a linear sliding keyed connection (18) between said inner coupling sleeve and said biasing means (9) whereby rotation of said inner coupling sleeve effects axial movement thereof on said threaded connection;

interacting cam means (21) carried by said coupling sleeves for rotation of said outer coupling sleeve by said other of the valve members to effect rotation of said inner sleeve with said biasing means in response to said axial movement in a rotative direction opposite to the direction of rotation of said one of the valve members to increase the relatively rotated position of said cam members (12, 13) and increase return bias beyond that needed for return of said valve members to the neutral position so that, upon release of steering force on said one of the valve members, said valve members overtravel beyond the neutral position to reversely pressurize said servomotor to return the wheels of a vehicle to straight ahead position.

4,421,011

POWER STEERING SYSTEM FOR MOTOR VEHICLES

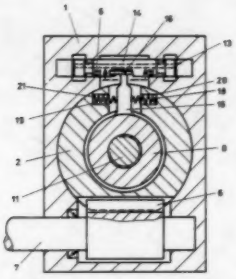
Dieter Elser, Essingen, Fed. Rep. of Germany, assignor to Zahnradfabrik Friedrichshafen, A.G., Friedrichshafen, Fed. Rep. of Germany

Filed Sep. 4, 1981, Ser. No. 299,325

Claims priority, application Fed. Rep. of Germany, Sep. 19, 1980, 3035407

Int. Cl.³ F15B *9/10*

U.S. Cl. 91—380 **11 Claims**



1. In a power steering system comprising within a housing, a servomotor having a piston (2) with a worm shaft (11) rotative by a steering wheel extending thereinto and a steering nut (8) rotative on said worm shaft within said piston and having axial movement therewith including a flow control valve (14) for pressure and exhaust flow control of said servomotor and actuatable in a selected direction by actuating means (16) (160) engaged with said control valve and carried by and rotative with said steering nut;

further including valve return means (18, 19, 22) for return of said flow control valve to a neutral position connected to be stressed upon initial rotation of said steering nut by steering rotation of said worm shaft in actuating said valve and being operative to effect return of said steering nut to a centered position upon release of steering force on said steering wheel whereat said valve is in a neutral position;

the improvement wherein:

said actuating means comprises elements (16-16', 17) (23, 24) operatively connected to said steering nut and to said flow control valve and coacting responsive to axial movement of said steering nut by said servomotor piston to actuate said flow control valve in a direction to reverse the pressurizing of said servomotor by actuating said flow control valve in a direction opposite to the selected direction to straighten the wheels of a vehicle after a turn upon release of the steering wheel and said actuating means being operatively connected to said valve return means for return to neutral position.

4,421,012

CONTROL CIRCUIT THROTTLING VALVE

Norbert Mucheyer, Rechtenbach, and Heinz Schulte, Marktheidenfeld, both of Fed. Rep. of Germany, assignors to G. L. Rexroth GmbH, Lohr, Fed. Rep. of Germany

Filed Feb. 13, 1981, Ser. No. 234,433

Claims priority, application Fed. Rep. of Germany, Feb. 15, 1980, 3005755

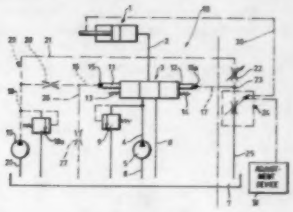
Int. Cl.³ F15B *13/16*

U.S. Cl. 91—388 **8 Claims**

1. A control circuit throttling valve defining a valve throttling section provided as a controlled dimension received in a hydraulic circuit for the control of a final control element, wherein said valve is adjustable and performs a receiver function under control of a mechanical coupling coupled to a moving part of the final control element which changes the valve throttling section, comprising:

a casing having a control connection and a discharge connection; and

a single movable throttling body received in a sealed manner provided in said casing and capable of linear movement and rotational movement within said casing, said body having a control surface formed a sealed throttling space between the throttling body and the inner surface of the casing located relative to said control and discharge connections such that rotational movement and linear movement of said body independently control the opening degree of communication between said control and discharge connections;



wherein the receiver function is effected by selecting one of said rotational and linear movements and implementing the selected of said movements of said body, and an adjusting function is implemented by selecting the other of said rotational and linear movements and implementing the other movement of said body.

4,421,013

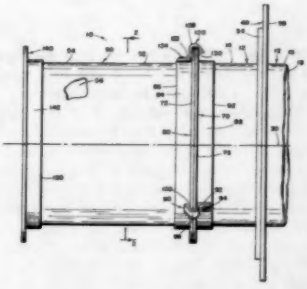
AERATION FAN MOUNTING SYSTEM

James L. Hansen, P.O. Box 233, Crofton, Nebr. 68730

Filed Apr. 7, 1980, Ser. No. 138,146

Int. Cl.³ F16L *37/26;* **E04H** *7/22*

U.S. Cl. 98—55 **1 Claim**



1. An aeration fan mounting system comprising a grain storage building, a wall adapter mounted on said building, a fan housing adapted to have a fan of a size suitable for grain aeration mounted therein, said adapter and fan housing having aligned cylindrical interior and exterior surfaces having a same horizontal axis, said wall adapter and said fan housing being arranged end-to-end adjacent each other, said wall adapter and said fan housing having on the cylindrical interior surfaces thereof wall adapter-mounted and fan housing-mounted insertion rings thereon and protruding outwardly therefrom substantially radially of said axis and means retaining said wall adapter insertion ring and said fan housing mounted insertion ring on said wall adapter and fan housing, respectively, wall

adapter-mounted support bracket means providing upwardly opening support recess means receiving said fan-mounted insertion ring and disposed on opposite sides of said horizontal axis as seen in top plan view at first and second horizontally spaced support points and means securing said support bracket means to said wall adapter mounted insertion ring, a holding bracket means providing a downwardly opening holding recess means disposed above said upwardly opening support recess means and removably receiving said fan-mounted insertion ring whereby as said fan housing is lifted with respect to said wall adapter said fan housing-mounted bracket means is removed from the upper side of said adapter-mounted insertion ring, said support recess means of each of said bracket means being progressively narrower towards its radially outermost portion so as to guide said insertion rings toward each other whereby said fan housing is guided toward said adapter and whereby accuracy of initial placement of said rings in said recesses is not as critical and yet said rings are drawn into a close fit and in axial alignment with each other.

4,421,014

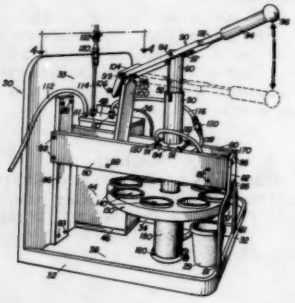
BEVERAGE PREPARATION ASSEMBLY

Wayne Vicker, 2480 SW. 57th Ter., Hollywood, Fla. 33023

Filed Jan. 5, 1983, Ser. No. 441,085

Int. Cl.³ A47J *31/00*

U.S. Cl. 99—289 P **17 Claims**



1. A beverage preparation assembly of the type primarily designed to individually produce beverage servings of predetermined quantity, said assembly comprising:

base means disposed in supporting relation to a remaining portion of said assembly, liquid storage means disposed for liquid delivery to other portions of said assembly, liquid dispersement means disposed in fluid communication with said liquid storage means, liquid driving means mounted on said base means in fluid communication between said liquid storage means and said liquid dispersement means and structured to force a predetermined quantity of liquid from said liquid storage means to said liquid dispersion means, filter means structured for holding beverage ingredients therein and disposed for liquid delivery to a predetermined position container wherein such filter means comprises a support plate and a plurality of filter receptacles mounted thereon in spaced apart relation to one another substantially about the periphery thereof, said support plate movably mounted on said base means and positionable rotatably for alignment of successive filter receptacles with said liquid dispersion means and further positionable axially along the rotational axis of said support plate into sealing engagement between an aligned filter receptacle and said liquid dispersion means, whereby an individual quantity of beverage is formed by filtering separate liquid quantities through beverage ingredients maintained in separate filter receptacles.

4,421,015

RADIANT HEAT COOKING APPARATUS

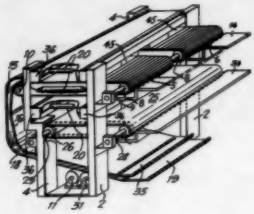
Adrian G. Masters, and Jeffery E. Munden, both of Maidenhead, England, assignors to United Biscuits (UK) Limited, Middlesex, England

Filed May 15, 1981, Ser. No. 263,960

Claims priority, application United Kingdom, May 16, 1980, 8016223; May 16, 1981, 8108188

Int. Cl.³ A47J *27/62*

U.S. Cl. 99—332 **16 Claims**



1. An apparatus for heating a food article, said apparatus comprising means defining a heating zone, support means positioned to support a food article in said heating zone, source means of radiation for heating a food article on said support means, said source means when energized at a first voltage level producing radiation having maximum intensity at a wavelength between 0.72 μm and 2.5 μm and when energized at a second voltage level lower than said first voltage level producing radiation having maximum intensity at a wavelength greater than 2.5 μm, means for energizing said source means at either said first or said second voltage level, sensing means for sensing the presence of a food article on said support means, and control means adapted to change said source means energization from said second voltage level to said first voltage level in response to the sensing of a food article on said support means by said sensing means.

4,421,016

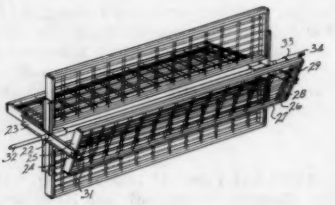
COOKING APPARATUS

Mirko H. Sich, 70 Dudley Ave., Daw Park, Australia 5041

Division of Ser. No. 179,796, Aug. 20, 1980, abandoned. This application Apr. 23, 1982, Ser. No. 371,251

Int. Cl.³ A47J *37/07*

U.S. Cl. 99—402 **11 Claims**



1. A barbecue of a type which holds food to be cooked above a heat source, characterized according to this invention in that there is provided a deep box comprising a base and confining sides having an upper perimeter, means within the base to support burning coals across the base to provide the heat source, and food holding means pivotally supported for rotation about a pivot support axis and adapted to hold separate pieces of food symmetrically about the pivot support axis of the food holding means, the food holding means including a support frame comprising a plurality of opposed support arms

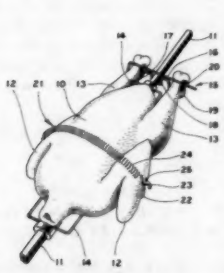
arranged to separably support food holding grids, said support arms radially extending from said pivot support axis adjacent lateral extremities of said food holding means at axially spaced positions along said pivot support axis, each of said food holding grids being separably mounted between an associated pair of opposed support arms for pivotal rotation about an arm pivot axis which is parallel to the pivot support axis, each of said food holding grids comprising a pair of unconnected framed grid members adapted to be assembled in overlying relationship with the food to be cooked therebetween for mounting between its associated pair of opposed support arms during cooking, each of said pairs of framed grid members being retained in said assembled overlying relationship during cooking solely by the mounting thereof between said support arms, and said framed grid members of each pair being detached and freely separable from one another upon dismounting from said support arms to allow access to the food.

4,421,017

ROTISSERIE ACCESSORY FOR PREPARING FOWL

John Ross, Akron, Ohio, assignor to The Collectors Box, Akron, Ohio

Filed Feb. 28, 1983, Ser. No. 470,054
Int. Cl.³ A47J *43/18*
U.S. Cl. 99—421 R **10 Claims**



1. Apparatus for confining the wings and legs of a fowl, the fowl being mounted on the spit of a rotisserie with the spit extending longitudinally through the fowl between its wings and between its legs comprising, pin means extending generally laterally through the body of the fowl near the wings thereof, truss means extending around the wings of the fowl and held by each end of said pin means, and leg clip means fixedly positioning the legs of the fowl relative to the spit.

4,421,018

FORCED CONVECTION OVEN

Gunter G. Prypatsch, South Delta; Lennox M. Leila, Richmond; Gerald E. Parkinson, Vancouver, and Leonard A. Arneson, Port Coquitlam, all of Canada, assignors to Omega Air Flow-21, Ltd., South Delta, Canada

Filed Oct. 5, 1981, Ser. No. 308,158
Int. Cl.³ A47J *27/026*
U.S. Cl. 99—447 **18 Claims**

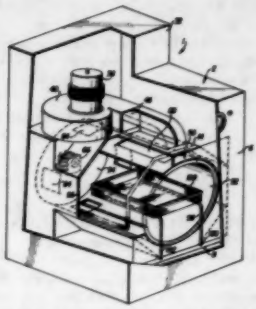
1. A device for cooking or heating food comprising:

a housing with an inside;

a stationary support inside the housing with a position for supporting the food;

means for supplying a stream of hot air to the inside of the housing; and

means for directing the stream of hot air towards the position of the food and for moving the stream of hot air about the position of the food to uniformly heat or cook the food, the means for directing comprising a hollow drum with an open end, the stationary support projecting into



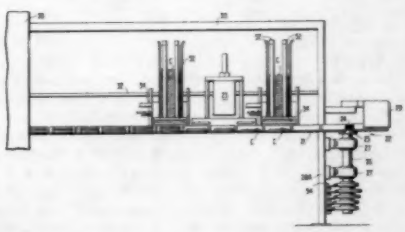
the open end of the drum and the drum being rotatable about the stationary support.

4,421,019

COOKIE DISPENSING APPARATUS

Paul R. Hocking; Jay G. Straight, and Henry P. Moore, all of Richmond, Va., assignors to Eskimo Pie Corporation, Richmond, Va.

Filed Aug. 16, 1982, Ser. No. 408,566
Int. Cl.³ A21C *9/04, 15/00*; A23P *1/00*; B65G *59/06*
U.S. Cl. 99—450.4 **14 Claims**



11. In an apparatus for the manufacture of frozen confections including an endless conveyor, a freezing chamber, means for moving said conveyor along a fixed path externally of said freezing chamber and thence through said freezing chamber, a downwardly facing extruder nozzle of established cross sectional shape located above said fixed path wherein the improvement comprises,

an apparatus for dispensing a lowermost cookie from the bottom of a stack of cookies onto a location along said fixed path including a frame,

a substantially horizontal block supported by said frame having a vertical aperture therein,

means connected to said block for holding said stack of cookies in vertical alignment with said aperture,

a horizontal plate means under said block supported by a first moving means mounted on said frame operable to move said plate means between an obstructing position in which said plate obstructs said aperture to a cleared position in which said plate does not obstruct said aperture,

a horizontal finger means above said horizontal plate means supported by a second moving means mounted on said frame operable to move said finger means from a closed position in which said finger means obstructs said aperture to an open position in which said finger means does not obstruct said aperture, and

a control means operable in timed relation to said conveyor

moving means operatively associated with said first and second moving means to move said plate means to its obstructing position while said finger means is in its open position to allow said stack of cookies to be supported by said plate means, then to move said finger means to its closed position to separate the lowermost cookie in the stack from cookies thereabove and to support the cookies thereabove, then to move said plate means to its cleared position to allow said lowermost cookie to drop downwardly, then to return said plate means to its obstructing position, then to move said finger means to said open position to allow said stack of cookies to drop onto said plate means.

4,421,020

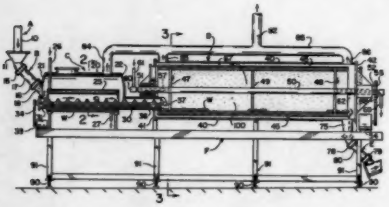
APPARATUS FOR THE CONCENTRATION OF FRUITS

David R. Gross, Orrville, Ohio, assignor to The J. M. Smucker Company, Orrville, Ohio

Division of Ser. No. 266,203, May 22, 1981, Pat. No. 4,379,796. This application Jan. 24, 1983, Ser. No. 460,462

Int. Cl.[3] **A23L** *1/212, 2/08;* **A23N** *1/00*

U.S. Cl. 99—472 **2 Claims**



1. Apparatus for the concentration of fruits comprising in combination: a deaerating chamber and a concentrating chamber, each of said chambers having an entrance end and an exit end, said exit end of said deaerating chamber being in continuous communication with said entrance end of said concentrating chamber; means for maintaining both of said chambers at a vacuum in excess of 20 inches of mercury; an air lock at the entrance to said deaerating chamber for communicating pieces of fruit to said chamber; means for moving said fruit through said deaerating chamber and into said concentrating chamber, said concentrating chamber comprising a hollow heated cylinder having a smooth inner surface; means for rotating said cylinder about a longitudinal axis; an air lock at the exit end of said cylinder remote from said deaerating chamber for receiving concentrated fruit; means for heating said deaerating chamber and independent means for heating said concentrating chamber; said cylinder having a longitudinal axis sloping downwardly from said exit end of said deaerating chamber to said exit end of said concentrating chamber.

4,421,021

CITRUS JUICE EXTRACTOR HAVING MEANS FOR SEPARATING JUICE PULP AND RAG FROM PEEL

Franklin K. Holbrook, La Habra, Calif., assignor to Brown International Corporation, Covina, Calif.

Continuation of Ser. No. 935,492, Aug. 21, 1978, abandoned. This application Apr. 15, 1980, Ser. No. 140,471

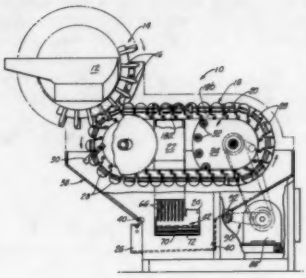
Int. Cl.[3] **A23N** *1/00*

U.S. Cl. 99—504 **35 Claims**

1. In a citrus fruit juice extractor of the type having means for extracting juice, rag and pulp from citrus fruit, a discharge for citrus peel sections at one outlet and a discharge for rag and pulp particles and juice therefrom at another outlet, the juice, rag and pulp tending to include contaminants such as peel portions, whole fruit and whole fruit portions, the improvement comprising:

a roller grid structure positioned in spaced-apart relation below the juice extracting means, said roller grid structure comprising a plurality of rollers, means for supporting said rollers in rotatable, parallel spaced-apart relation and longitudinally extending surface means on said rollers,

means for collecting the juice, rag, pulp and included contaminants from the juice extracting means and conducting the juice, rag, pulp and included contaminants downwardly to said roller grid structure,



a contaminant outlet means formed above and adjacent one lateral side of said parallel rollers, the juice, rag and pulp outlet being formed below said parallel rollers, and

means for driving said rollers in rotation whereby said roller spacing and longitudinal surface means on said rollers allow the juice, rag and pulp to pass between the rollers while the contaminents are carried toward said contaminant outlet means.

4,421,022

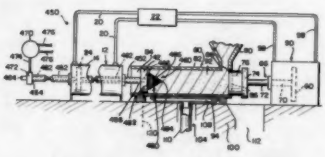
APPARATUS FOR PRODUCING AND COLLECTING A LIQUID EXTRACT AND A DRY BY-PRODUCT FROM A MASH

Kermit H. Burgin, R.R. #1, Box 334, Whitestown, Ind. 46075

Continuation-in-part of Ser. No. 135,922, Mar. 31, 1980, Pat. No. 4,343,233. This application Mar. 10, 1982, Ser. No. 356,841

Int. Cl.[3] **B30B** *9/06*

U.S. Cl. 100—98 R **10 Claims**



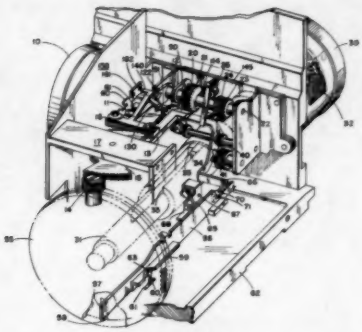
1. An apparatus for producing and collecting a liquid extract and a dry by-product from a mash of material, comprising: an extraction chamber having at least one open end, the chamber including a material inlet opening in proximity to the open end for filling the chamber with the mash and a liquid outlet opening for collecting the liquid extract, a by-product outlet opening for collecting the dry by-product, a piston, a plunger movable in the chamber to compress the mash, first means for coupling the plunger to the piston, enclosure means for closing the open end, first drive means for moving the piston to compress the mash within the extraction chamber and to expel the by-product therefrom, agitating means for agitating the mash, second means for coupling the agitating means to the piston, and second drive means for rotating the agitating means with respect to the plunger to agitate the mash.

4,421,023

PRINTER CONTROL SYSTEMS FOR ELECTRONIC POSTAGE METER

Lloyd G. Kittredge, Trumbull, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed May 20, 1982, Ser. No. 380,206
Int. Cl.³ B41J 3/44
U.S. Cl. 101—45 14 Claims



1. In an electronic postage meter including a printer, a setting mechanism for setting the printer, and an electronic accounting and control system connected to control the setting mechanism, wherein the setting mechanism includes a shutter bar movable into and out of a position to block operation of the printer, and first and second interposers positioned to selectively block the shutter bar, said electronic accounting and control system being connected to control said first interposer to block said shutter bar in the event of incorrect operating conditions or failure in the postage meter; the improvement comprising means coupled to said electronic accounting and control system for controlling the position of said second interposer to enable blocking of said shutter bar in accordance with a program of said control system independently of said setting mechanism; said setting mechanism having a first position at which said printer cannot be set and at least one other position at which said printer can be set, and lock means inhibit the release of said second interposer at said other position or position of said setting mechanism.

4,421,024

PRINTING PLATE ATTACHMENT SYSTEM

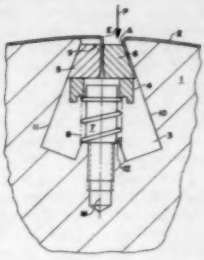
Rainer Burger, Augsburg, and Werner Kleininger, Neusass, both of Fed. Rep. of Germany, assignors to M.A.N.-ROLAND Druckmaschinen Aktiengesellschaft, Offenbach am Main, Fed. Rep. of Germany

Filed Apr. 19, 1982, Ser. No. 369,882
Claims priority, application Fed. Rep. of Germany, Apr. 25, 1981, 3116506
Int. Cl.³ B41F 27/12
U.S. Cl. 101—415.1 12 Claims

1. Printing cover attachment system for attachment of a cover element (2) to a cylinder (1) of a printing machine, in which the cylinder is formed with an axial groove (3) having outwardly converging side walls (10, 11), and outwardly spring-biased clamping wedge means (5, 6) are provided to clamp the end portions of the cover element (2) in position on the cylinder, wherein in accordance with the new invention

the clamping wedge means comprises two essentially parallel parts (5, 6) extending axially in the groove, said parts having essentially trapezoidal cross section with an inclined surface facing against the inclined side walls (10, 11) and facing surfaces fitting essentially against each other;

and the cover element (2) is clamped with one end (A) between one inclined side wall (10) and the inclined surface of the adjacent clamping part (6) and with the other



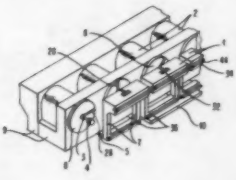
end (E) between the facing surfaces of both clamping parts (5, 6).

4,421,025

SPRING MOUNTED TORSIONALLY RIGID PRINT HAMMER MECHANISM

William D. Thorne, Wake Forest, and William A. Patterson, Durham, both of N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 21, 1981, Ser. No. 333,091
Int. Cl.³ B41J 3/00
U.S. Cl. 101—93.04 2 Claims



1. A printing hammer and driver mechanism for impact printers, comprising:

an electromagnetic coil having a hollow axial core;

a magnetic plunger slidably received within said hollow axial core;

a magnetic flux path member connecting the ends of said hollow core on said electromagnetic coil and completing a flux path from one end of said coil to the other, said flux path member having apertures coaxially aligned with said hollow core;

a push wire;

said push wire being connected to one end of said plunger and extending outwardly therefrom through said hollow core and through one of said apertures in said flux path member;

said push wire having a termination means on the end thereof opposite to said plunger;

a print hammer;

said hammer having an impact face spanning a plurality of impact positions along a print line proximate to one end of said hammer;

a single flexible spring hammer support and restoring element proximate the other end of said hammer having a width in the direction of said print line approximately as great as that of said impact face of said hammer measured to said print line parallel said spring lying in a plane parallel to said print line and spaced from said print line by a distance substantially equal to the distance between said impact face and said other end of said hammer, said hammer having an axis which is perpendicular to both said one

end and said other end, said spring being perpendicular to said axis

said flexible spring having two ends, one end being anchored and the other end thereof being rigidly affixed to said hammer to support said hammer's weight and to resiliently restore said hammer towards its retracted position;

said push wire being connected through said termination means to said hammer at a position along said axis thereof which is removed from the point thereon where said flexible spring is attached thereto;

said plunger being positioned in said hollow core of said electromagnet and resiliently biased away from the symmetrical center thereof by said flexible spring forcing said hammer and attached push wire in a direction to exert force on said push wire to position said plunger; and

said plunger being drawn toward the symmetrical center of said core upon application of electrical current thereto to force said push wire and hammer in the opposite direction to that urged by said spring.

4,421,026

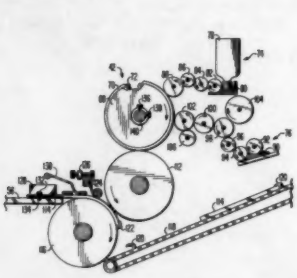
PROCESS COLOR OFFSET PRINTING DUPLICATOR

Francis E. McCullion, Jr., Colts Neck, N.J., assignor to Cymaticolor Corporation, Edison, N.J.

Filed Apr. 15, 1981, Ser. No. 254,456

Int. Cl.³ B41F *7/06, 21/12, 21/14*

U.S. Cl. 101—136 **17 Claims**



1. A process color offset printing duplicator for printing an image in full color which comprises:

(a) means for feeding sheet stock onto a delivery table of a first duplicator head for effecting registration of said sheet stock;

(b) a plurality of serially arranged offset duplicator heads each of which includes a plate cylinder for holding a plate bearing said image, an impression cylinder, and a blanket cylinder having mounted thereon a blanket to receive said image from said plate cylinder, said impression cylinder adapted to bring a sheet of said stock into contact with said blanket to print a single color ink onto said sheet of said stock,

(c) said serially arranged offset duplicator heads each having one of said delivery tables, a first one of said offset duplicator heads having means for receiving said sheet of said stock from said feeding means and delivering said sheet of said stock onto said impression cylinder of said first duplicator head, means on said impression cylinder for transferring said sheet to a first chain gripper, said first chain gripper including means for feeding said sheet onto one of said delivery tables of a second of said offset duplicator heads, each of said second, and subsequent ones of said offset duplicator heads further including corresponding ones of said delivery tables, sheet stock receiving and delivering means, transferring means and a chain gripper, said impression cylinder of a final one of said offset duplicator heads feeding said sheet of said stock onto a corresponding final one of said chain grippers, and registration means at each of said delivery tables for providing horizontal and vertical registration for the accurate application of said image to said sheet of said stock between each of said offset duplicator heads, and each of said offset duplicator heads including a water reservoir for holding water, means for delivering water from said water reservoir to said plate on said plate cylinder, an ink fountain for holding ink, and means for delivering ink from said ink fountain to said plate on said plate cylinder, said means for delivering ink being adapted to apply a relatively thin coat of ink onto said plate mounted on said plate cylinder.

4,421,027

MULTIPLE PRINTING MODE PRINTING MACHINE SYSTEM

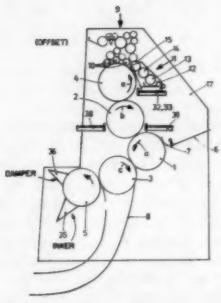
Hermann Fischer, Augsburg, Fed. Rep. of Germany, assignor to M.A.N.-Roland Druckmaschinen Aktiengesellschaft, Offenbach am Main, Fed. Rep. of Germany

Filed Mar. 22, 1982, Ser. No. 360,068

Claims priority, application Fed. Rep. of Germany, Apr. 25, 1981, 3116505

Int. Cl.³ B41F *11/00, 5/24, 7/36;* **B41L** *25/14*

U.S. Cl. 101—142 **8 Claims**



1. Multiple printing mode rotary printing machine system for selectively printing in

(a) offset printing mode;

(b) direct lithographic printing mode;

(c) flexographic printing mode, having two side walls (**17, 18**);

a blanket cylinder (**2, 3**) located between the side walls;

cylinder means (**1**) for forming a printing or impression cylinder and defining, with the blanket cylinder,

a printing line;

a plate cylinder (**4, 5**) located and retained between the side walls adjacent the blanket cylinder (**2, 3**), said plate cylinder being movable into and out of engagement with the adjacent blanket cylinder;

an inker (**9**) selectively engageable with the plate cylinder;

and a liquid application system (**11**)

wherein, in accordance with the invention,

the liquid application system (**11**) is a film system having a liquid trough (**12**), a pickup roller (**13**) at least in part located in the trough, a liquid transfer roller (**14**), and a liquid application roller (**15**);

and first, second and third individual positioning and support means (**32, 33; 38; 39**) are provided, located on said side walls for selectively positioning and supporting said liquid application system in accordance with a selected mode of printing of the machine, comprising

(a) for offset printing: the first support means (**32, 33**) being located for, and supporting the liquid application system adjacent to and in liquid transfer contact with said plate cylinder (**4, 5**) in advance—with respect to the direction of rotation (a) of the plate cylinder—of the inker (**9**);

and wherein the liquid in the liquid trough comprises damping liquid;

(b) for direct lithographic printing: the second support means (38) being located for and supporting said liquid application system adjacent to and in liquid transfer contact with said blanket cylinder (2, 3) in advance—with respect to the direction of rotation (b) of the blanket cylinder—of said plate cylinder (4, 5);

wherein the liquid in the liquid trough comprises damping liquid; and

wherein said plate cylinder supplies ink to the blanket cylinder from the inker;

(c) for flexo printing: the third support means (39), being located for and supporting said liquid application system adjacent to and in liquid transfer contact with said blanket cylinder (2, 3) in advance—with respect to the direction of rotation (b) of the blanket cylinder—of the printing line and in the zone adjacent the blanket cylinder between the plate cylinder and said printing line;

wherein the liquid in the liquid trough (12) comprises flexo printing ink; and

wherein said plate cylinder is out of contact with the blanket cylinder, the blanket cylinder carries a flexo printing plate.

4,421,028

DELIVERY TABLE FOR SHEET-FED PRINTING PRESSES

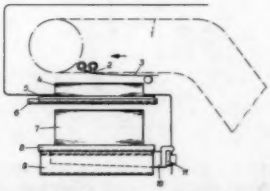
Gerhard Pollich, Heidelberg, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Continuation of Ser. No. 771,788, Feb. 24, 1977, which is a continuation of Ser. No. 631,679, Nov. 13, 1975, abandoned. This application Aug. 22, 1978, Ser. No. 935,784

Claims priority, application Fed. Rep. of Germany, Feb. 15, 1975, 25063916

Int. Cl.³ B41F *13/64*

U.S. Cl. 101—240 **1 Claim**



1. Method of removing printed sheets from a printing machine which comprises stacking printed sheets delivered from a sheet delivery system onto a legless first delivery table having means for securing supporting legs thereto, securing legs to the legless first delivery table, interposing a legless second delivery table between the first delivery table and the sheet delivery system, removing the first delivery table, and repeating the foregoing method steps with the second delivery table and a third delivery table.

4,421,029

SUPPLY CIRCUIT FOR A LOAD WHICH IS TO BE CONTINUALLY SUPPLIED WITHIN A PROJECTILE

Harald Wich, Schwaig, Fed. Rep. of Germany, assignor to Diehl GmbH & Co., Nuremberg, Fed. Rep. of Germany

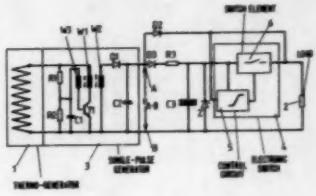
Filed Jul. 27, 1981, Ser. No. 287,473

Claims priority, application Fed. Rep. of Germany, Aug. 2, 1980, 3029491

Int. Cl.³ F42C *11/00*

U.S. Cl. 102—207 **4 Claims**

1. In a supply circuit for a load to be continually supplied in a projectile, including a generator, particularly a thermo-generator connected ahead of a voltage generator, which provides a power output which rises to a maximum in a first phase of the load and drops off in a second contiguous phase of the load, wherein during the first and the second supply phase the power provided is greater than the power required for the operation of the load; the improvement comprising: said load and an RC-charging circuit having a storage condenser connected in parallel with said voltage generator output so as to charge the storage condenser during the first supply phase; a diode connected in said RC-charging circuit so as to prevent a



discharge of said storage condenser during the second supply phase; and a switch controlled by the output voltage of the voltage generator being connected between the storage condenser and the load, said switch being blocked during the first and the second supply phase and being actuated upon the output voltage of the voltage generator having reached a value insufficient for the operation of the load whereby in a contiguous third supply phase the load is supplied through said switch from said storage condenser.

4,421,030

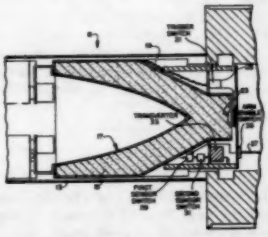
IN-LINE FUZE CONCEPT FOR ANTIARMOR TACTICAL WARHEADS

Jon G. DeKoker, Renton, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Oct. 15, 1981, Ser. No. 311,907

Int. Cl.³ F42C *15/40, 19/00*; F42B *13/10*

U.S. Cl. 102—218 **11 Claims**



1. A safe and arm device for supplying a triggering signal to an explosive detonator of a shaped charge warhead flown to impact a target comprising:

a power source;

a toroidally-shaped trigger capacitor surrounding a portion of said shaped charge;

means for selectively coupling said power source to said trigger capacitor to charge said trigger capacitor; and

means responsive to the impact of the warhead against the target for enabling the discharge of said capacitor to generate said triggering signal.

4,421,031

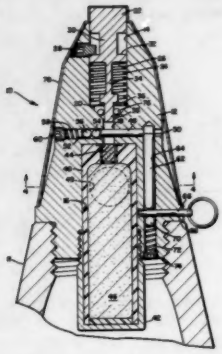
PERCUSSION FUSE FOR TRAINING PROJECTILES

Harry R. Carter, and Randall R. Carter, both of Moscow, Pa., assignors to Pocal Industries, Inc., Moscow, Pa.

Filed May 1, 1981, Ser. No. 259,542

Int. Cl.³ F42C *15/24*

U.S. Cl. 102—252 **30 Claims**



1. A fuse assembly for use in a projectile such as a mortar shell or the like, said assembly comprising:

(a) a body,

(b) striker means generally axially movably mounted within said body between a forward safe position and a rearward charge detonating position in which it causes detonation of a charge,

(c) slider means mounted within said body for movement between a safe position in which it prevents movement of said striker means to said detonating position and a retracted armed position in which it permits movement of said striker means to said detonating position,

(d) set-back means mounted within said body in a normal safe position in which it retains said slider means in safe position,

(e) said set-back means being movable from said safe position to an armed position in response to a predetermined inertial force acting thereupon following propulsion of said projectile to release said slider means for movement to its armed position, and

(f) blocking means mounted within said body for movement in response to gravity to a safe position during upward trajectory flight of said projectile in which it prevents movement of said striker means to said detonating position and to an armed position during downward trajectory flight of said projectile in which it permits movement of said striker means to said detonating position upon impact with a target.

4,421,032

AMMUNITION

Karl Rudolf, Schrobenhausen, and Helmut Hessberg, Sünzhausen, both of Fed. Rep. of Germany, assignors to Messerschmitt-Bölkow-Blohm Gesellschaft mit beschränkter Haftung, Munich, Fed. Rep. of Germany

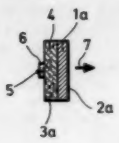
Filed Sep. 2, 1980, Ser. No. 186,614

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1979, 2936749

Int. Cl.³ F42B *1/02*

U.S. Cl. 102—307 **3 Claims**

1. Ammunition for combatting armored targets, comprising a projectile of inert material formed as a form-stable plate having a first face surface arranged to face the target, an oppositely directed second face surface, and a peripheral edge surface extending around and between said first and second face surfaces, an explosive charge located on and covering said second face surface of said place for accelerating said plate as a unit thereby retaining substantially the original shape and



dimension of said plate in direction toward the respective target from a pre-determined target distance.

4,421,033

EXERCISE PROJECTILE

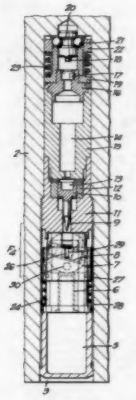
Gerard E. Dupont, Doische, Belgium, assignor to s.a. PRB, societe anonyme, Brussels, Belgium

Filed Aug. 31, 1981, Ser. No. 298,107

Claims priority, application Belgium, Sep. 19, 1980, 2/58755

Int. Cl.³ F42B *9/20*

U.S. Cl. 102—529 **1 Claim**



1. In a practicing projectile having a head and including at least one explosive charge having associated therewith at least one delayed firing device, the improvement comprising:

(a) first and second coaxial pyrotechnic chains positioned one behind the other between the head and the charge;

(b) the first chain including:

1. a first striker,
2. a first locking means securing the first striker and releasing same when subjected to the joint effect of projectile acceleration and centrifugal force developed when the projectile is fired,
3. a primer,
4. a delaying charge, and
5. an explosive propulsive charge;

(c) the second chain including:

1. a second striker,
2. a second locking means for securing the second striker and releasing and permitting same to be propelled when the explosive propulsive charge is fired;

(d) a pyrotechnic switch including:

1. a rotor having two pins with flat ends,
2. a rotor carrier rotatably mounting the rotor, and
3. a detonator carried by the rotor; and

(e) a third locking means including:

1. a spring,

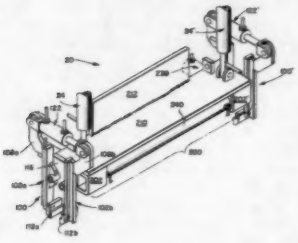
2. a slidable ring surrounding the rotor carrier and including slots for receiving the flat ends of the pins, and
3. the slidable ring being maintained in an operative position by the spring for securing the rotor, and being brought into an inoperative position for releasing the rotor through the action of the accleration force, during which the rotor is rotated to align the detonator with the striker through the action of the centrifugal force.

4,421,034

COMPACT BIDIRECTIONALLY OPERATIVE TIE EXCHANGING APPARATUS

Franz Allmer, Sophia, N.C., assignor to Canron Corporation, West Columbia, S.C.

Filed Jun. 18, 1981, Ser. No. 274,768
Int. Cl.³ B61D *15/00*; E01B *29/06, 29/10*
U.S. Cl. 104—9 **30 Claims**



1. A railway tie removing apparatus comprising:
an extensible beam means including first and second beams, one telescopically received within the other;
a support means for supporting said first and second beams relative to a support vehicle;
selectively actuatable lock means for locking a selected one of said first and second beams to said support means;
tie gripping means mounted on said first and said second beams for selectively gripping a railway cross tie; and
force actuator means connected to said first and to said second beams for causing said first and said second beams to telescopically extend relative one another;
whereby actuating said locking means to lock one of the first and second beams to the support means and unlock the other and operating the force actuator means causes the unlocked other of the first and second beams to extend relative to the locked beam, and actuating said locking means to lock the other of the first and second beams to the support means and unlock the one and operating the force actuator means causes the unlocked one of the first and second beams to extend relative to the locked other beam.

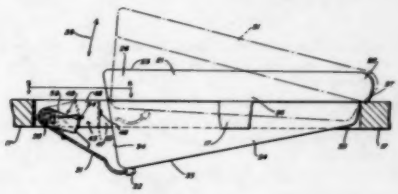
4,421,035

APPARATUS FOR LOCKING A KEYBOARD AT SELECTED INCLINATIONS TO A HORIZONTAL REFERENCE

Bernd Gubbe, Nuremberg; Klaus-Dieter Krause, Oberasbach; Otto Schonemann, Furth, and Rudolf Neidhardt, Nuremberg, all of Fed. Rep. of Germany, assignors to Triumph-Adler A.G. fur Buro-und Informationstechnik, Nuremberg, Fed. Rep. of Germany

Filed Apr. 14, 1981, Ser. No. 254,124
Claims priority, application Fed. Rep. of Germany, Apr. 15, 1980, 3014325
Int. Cl.³ A47F *5/12*
U.S. Cl. 108—6 **4 Claims**

1. A work station support comprising
a horizontal extending platform having an opening defining front, rear and side walls,
a work station having an upper portion whose width is greater than the distance between said side walls, said work station being pivotally mounted on said platform adjacent the front wall of said opening for adjusting pivotal movement upwardly from a rest position at which the work station is supported on said platform to selected positions at which the work station is inclined relative to said horizontal platform,
means for lockingly supporting said work station in a selected inclined position within a range of positions incident to its release following its upward pivoting movement to an inclined position, comprising
a shaft rotatably mounted in opposite side walls of said platform opening with its axis parallel to said rear wall,
a toothed segment and an arm secured to said shaft,
said toothed segment extending into said opening at right angles to said shaft axis with its teeth directed toward said front wall, and said arm extending below said opening and underlying said work station,
spring means mounted to rotatably bias said shaft whereby said arm is baised against the underside of said work station to follow said work station as it is moved from its rest position to an inclined position, the uppermost tooth of said tooth segment in the rest position of said work station being below a horizontal line,
a pawl,
a mounting means on said rear wall for pivotally supporting said pawl on an axis parallel to and spaced horizontally from the axis of said shaft and from the toothed end of said toothed segment,
said pawl having a tooth extending towards the shaft axis for arrangement with the teeth of said toothed segment, and
spring means for urging said pawl to a normal horizontal attitude above the uppermost tooth of the toothed segment whereby rotation of said shaft incident to pivoting upward movement of said work station will cause the toothed segment to deflect the pawl about its pivot axis and upon release of said work station will cause said pawl tooth to engage a segment tooth to thereby arrest return movement of said tooth segment and said arm whereby said work station will be supported at a selected inclination by said arm.



4,421,036

PLANT FOR THE COMBUSTION OF IMPURE SOLID FUEL

Roine Brännström, Finspong, and Lars-Erik Karlsson, Aby, both of Sweden, assignors to Stal-Laval Turbine AB, Västeras, Sweden

Filed Feb. 9, 1982, Ser. No. 347,204
Claims priority, application Sweden, Feb. 19, 1981, 8101110
Int. Cl.³ F23H *5/18*
U.S. Cl. 110—186 **13 Claims**

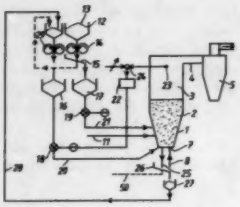
1. A plant for the combustion if impure solid fuel, comprising:
a combustion chamber;
means for supplying impure solid fuel to said combustion chamber;
means for supplying fine-grained and coarse-grained absorbent material to said combustion chamber, said absorbent

material being effective to absorb sulfur formed in said combustion chamber by combustion of said solid fuel therein;

means for creating a fluidized bed of said absorbent material in said combustion chamber;

means for withdrawing absorbent material directly from ssaid fluidized bed;

means for crushing said absorbent material withdrawn directly from said fluidized bed into a fine-grained absorbent material;



transducer means for producing a first signal proportional to the sulfur dioxide content in the exhaust gases leaving said fluidized bed;

signal processing means, connected to said transducer means, for comparing said first signal with a second signal proportional to a desired value of the sulfur dioxide content; and

regulator means, connected to said signal processing means, for regulating the flow into said fluidized bed of fine-grained absorbent material produced by said means for crushing, in response to the difference between said first and second signals.

4,421,037

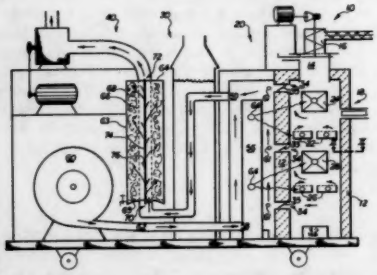
WASTE MATERIAL TREATMENT FURNACE

John A. Leam, 6445 Fairway Dr., Fayetteville, Pa. 17222

Filed May 10, 1982, Ser. No. 376,614

Int. Cl.³ F23G 7/04

U.S. Cl. 110—238 **21 Claims**



1. Apparatus for treating exhaust gases emitted from a furnace, comprising:

an elongated chamber defined by exterior wall members, an inlet opening adjacent a first end of said chamber for introducing said exhaust gases into said chamber, and an outlet opening adjacent a second and opposite end of said chamber for conducting said exhaust gases out of said chamber;

an elongated conduit defined by sidewalls extending within said chamber between and in communication with said inlet opening and said outlet opening, spaced from said exterior wall members of said chamber to provide a compartment therebetween extending about the periphery of the interior of said chamber between said first and second ends thereof, said sidewalls of said elongated conduit being permeable to the passage of said exhaust gas therethrough, said compartment communicating with said inlet opening and said outlet opening only through said permeable sidewalls of said elongated conduit;

selected material within said compartment between the exterior walls of said chamber and the sidewalls of said conduit through which said exhaust gas may pass during portions of its advancement from said first end toward said second end, said selected material reactive with at least portions of the composition of said exhaust gas to remove and/or alter said portions during passage therethrough; and

means mounted within said elongated conduit for directing said exhaust gas from the interior of said conduit through the sidewalls thereof into said compartment for interaction with said selected material, said directing means oriented within said elongated conduit to permit the return of said exhaust gas from said compartment to said elongated conduit and therefrom to said outlet opening.

4,421,038

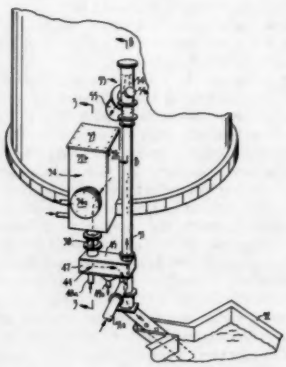
METHOD AND APPARATUS FOR REMOVING FOREIGN OBJECTS FROM FLUID BED SYSTEMS

Gary O. Goldbach, San Jose, and Michael A. O'Hagan, Cupertino, both of Calif., assignors to Combustion Power Company, Inc., Menlo Park, Calif.

Filed Sep. 20, 1982, Ser. No. 419,873

Int. Cl.³ F23G 7/00

U.S. Cl. 110—245 **4 Claims**



1. In a fluid bed combustion apparatus having,

an upstanding combustion chamber,

a porous support structure within the combustion chamber supporting a quantity of finely divided inert particles,

a first opening into the combustion chamber below the porous structure for introducing a stream of air for passage up through the porous support structure for fluidizing the quantity of particles,

a second opening into said combustion chamber for introducing combustible material which contains foreign objects,

a third opening at the top of the combustion chamber above the particles for passing products of combustion out of the combustion chamber,

a foreign object removal opening for removal of foreign objects from the quantity of particles from one side of the combustion chamber, and

means at a plurality of locations beneath the quantity of particles for introducing fluidizing air into the quantity of

particles in a lateral direction toward said foreign object removal opening,

the improvement comprising

a foreign object removal chamber projecting laterally outwardly from said combustion chamber,

a material flow control plenum chamber below said removal chamber, and having a first and a second end,

a foreign object collection tank located below said control plenum,

a first passageway means connecting said removal chamber to said first end of said plenum chamber for passing inert particles and foreign objects out of said combustion chamber,

particle separation and return means connecting said second end of said plenum chamber with both said combustion chamber and said collection tank for separating foreign objects which move to said tank from inert particles which move to said combustion chamber, and

means at a plurality of locations in the bottom of said plenum chamber for introducing fluidizing air into a quantity of inert particles and foreign objects in a direction from said first end to said second end of said plenum chamber.

4. In a fluid bed combustion apparatus having,

an upstanding combustion chamber,

a porous support structure within the combustion chamber supporting a quantity of finely divided inert particles,

a first opening into the combustion chamber below the porous structure for introducing a stream of air for passage up through the porous support structure for fluidizing the quantity of particles,

a second opening into said combustion chamber for introducing combustible material which contains foreign objects,

a third opening at the top of the combustion chamber above the particles for passing products of combustion out of the combustion chamber,

a foreign object removal opening for removal of foreign objects from the quantity of particles from one side of the combustion chamber, and

means at a plurality of locations beneath the quantity of particles for introducing fluidizing air into the quantity of particles in a lateral direction toward said foreign object removal opening,

the improvement comprising

a foreign object removal chamber projecting laterally outwardly from said combustion chamber,

a material flow control plenum chamber below said removal chamber, and having a first and a second end,

a deentrainment chamber means located above said control plenum for deentraining inert particles from a classifying stream of air,

a foreign object collection tank located below said control plenum,

a first passageway means connecting said removal chamber to said first end of said plenum chamber for passing inert particles and foreign objects out of said combustion chamber,

a second passageway means connecting said deentrainment chamber with said combustion chamber for returning inert particles to said combustion chamber,

air classifier means connecting said second end of said plenum chamber with both said deentrainment chamber and said collection tank for separating foreign objects which move to said tank from inert particles which move to said deentrainment chamber means, and

means at a plurality of locations in the bottom of said plenum chamber for introducing fluidizing air into a quantity of inert particles and foreign objects in a direction from said first end to said second end of said plenum chamber.

4,421,039

PULVERIZED COAL-FIRED BURNER

Vincent Llinares, Jr., Rockville, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Division of Ser. No. 305,060, Sep. 24, 1981. This application Dec. 10, 1982, Ser. No. 448,453

Int. Cl.³ F22B *37/42*; F23K *5/00*

U.S. Cl. 110—263 **3 Claims**

1. A burner for pulverized coal furnace comprising:

a. a horizontally disposed longitudinally elongated coal delivery pipe having an outlet end opening into the furnace, said coal delivery pipe defining a flowpath through which a stream of pulverized coal entrained in air passes to the furnace;

b. a second pipe disposed coaxially about said coal delivery pipe at least near the discharge end thereof so as to define therebetween an annular plenum chamber, said annular plenum chamber divided into at least four subchambers, said first chamber along the top of said coal delivery pipe, said second chamber along the bottom thereof, and third and fourth chambers along each side thereof, each plenum chamber connected in fluid communication with the flowpath defined within said coal delivery pipe by an opening through the wall of said coal delivery pipe at the discharge end thereof; and

c. said coal delivery pipe has an outwardly flared flange at its outlet end, said flange beginning to flare outtwardly at a point just downstream of the plenum chamber openings in the wall of the coal delivery pipe.

4,421,040

FURNACE

Olle Lindstrom, Lorensviksv 14, S-18363 Täby, Sweden

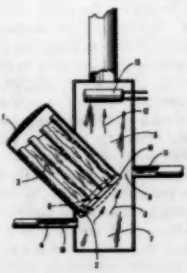
PCT No. PCT/SE81/00071, § 371 Date Oct. 27, 1981, § 102(e) Date Oct. 27, 1981, PCT Pub. No. WO81/02619, PCT Pub. Date Sep. 17, 1981

PCT Filed Mar. 6, 1981, Ser. No. 315,522

Claims priority, application Sweden, Mar. 7, 1980, 8001801

Int. Cl.³ F23N *13/00*

U.S. Cl. 110—294 **5 Claims**



1. A furnace for the container firing of non-slagging solid fuels such as wood, peat, and lignite, said furnace comprising:

a housing enclosing therewithin a grid space and a flame space, the latter disposed above the former,

a fuel container for retaining said non-slagging solid fuel, said container including an upper portion and a lower portion, at least said lower portion being disposed within said housing,

a perforate fuel retainer disposed across said lower portion of said fuel container, said retainer being inclined relative to horizontal so as to extend upwardly generally toward a restricted passage which interconnects said grid space and said flame space, said retainer including an upper side against which said solid fuel engages, and a lower side facing toward said grid space,

means for introducing reaction gas into said grid space at a location below said retainer to support combustion of said fuel within a gasification zone extending along said retainer, with fuel gas formed by such combustion flowing to said flame space through said passage, and

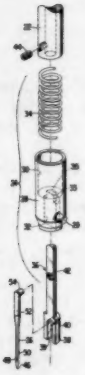
means for introducing combustion air to a location adjacent said passage to support combustion of said fuel gas within said flame space.

4,421,041

NEEDLE DESIGN AND CLAMPING SYSTEM

William Weisz, Tenafly, N.J., assignor to The Singer Company, Stamford, Conn.

Filed Oct. 7, 1981, Ser. No. 309,296
Int. Cl.³ D05B *55/02, 85/02*
U.S. Cl. 112—226 **2 Claims**



1. For a sewing machine or like mechanism utilizing a needle bar to carry a sewing needle having a point and a thread carrying eyelet adjacent to the point, through a work material, a needle clamping system comprising:

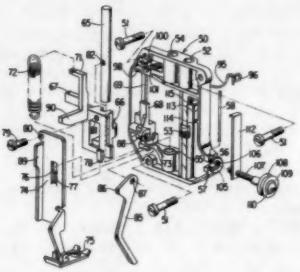
a sewing needle having an elongated blade having a first axis and a point at one end, and eye extending along a second axis through said blade adjacent said point, said blade opening up opposite said point to an enlarged shank, said shank terminating in a locator portion extending along a third axis substantially normal to said shank and forming a known angle with a plane including said first axis and said second axis; and means for clamping said sewing needle to said needle bar with said eye maintained in a specific position with respect to said needle bar, said clamping means further comprising a rod having an enlarged end with a transverse bore adjacent said end for receiving said locator portion of said needle and a groove extending from said transverse bore to said end for receiving said shank of said needle; a clamping sleeve having an axially aligned aperture extending from one end to receive said enlarged end of said rod with said locator portion and shank of said needle therein to be firmly retained thereby, an orifice communicating with said axially aligned aperture for accommodating passage of said rod, and a counterbore extending from said orifice to the other end of said clamping sleeve; a compression spring accommodated about said rod in said counterbore; and means for affixing said rod to said needle bar with said eye of said needle in said specific position, whereby said clamping sleeve may be axially shifted in opposition to said compression spring to expose said enlarged end of said rod so as to remove or install a needle with said locator portion in said transverse bore and said shank in said groove of said rod, and whereby said clamping sleeve may be urged by said compression spring to have said axially aligned aperture thereof firmly retain said needle to said rod.

4,421,042

SEWING MACHINE HEAD END MODULE CONSTRUCTION

Karl H. Killinger, Dover, N.J., assignor to The Singer Company, Stamford, Conn.

Filed Jun. 22, 1983, Ser. No. 507,207
Int. Cl.³ D05B *73/02*
U.S. Cl. 112—259 **1 Claim**



1. In a sewing machine having a casing with a work supporting bed and a bracket arm overhanging said bed, a stitch forming loop taker and a work feeding mechanism carried within said work supporting bed, said loop taker adapted to cooperate with a reciprocating needle of the type carrying a thread which is influenced by a thread take-up device and a thread tensioning device, and said work feeding mechanism adapted to engage work fabrics in opposition to a spring biased presser foot having a presser lifter associated therewith facilitating insertion and removal of work fabrics between said work feeding mechanism and said presser device, actuating mechanism in said bed for said loop taker and work feeding mechanism, and a needle actuating mechanism extending into said bracket arm with operative connections with said actuating mechanism in said bed,

the improvement which comprises a module secured to said sewing machine bracket arm and providing support for stitch forming devices including said reciprocatory needle, said needle thread take-up, said thread tension, said presser device and said presser lifter;

said module including an integral module frame of which the manufacture may be finished in a single molding operation utilizing a two part die with retractable mold inserts to define spaced aligned bearing bores in the module frame providing sliding support for the reciprocating needle and presser device,

an individual leaf spring having predetermined unstressed configuration for sustaining said needle thread take-up and said thread tension on said module frame, said module frame being formed with leaf spring accommodating apertures each with a configuration deviating substantially from that of a respective one of said unstressed leaf spring configurations,

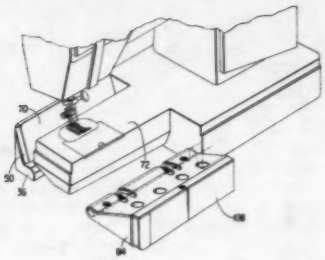
a boss molded on said module frame pivotally accommodating said presser lifter, and said presser device including a surface arranged closely adjacent to said presser lifter constraining said presser lifter on said module frame boss.

4,421,043

CONVERTIBLE BED FOR A SEWING MACHINE

Boleslaw Kornatowski, Elizabeth, and Kenneth D. Adams, Madison, both of N.J., assignors to The Singer Company, Stamford, Conn.

Filed Jun. 8, 1982, Ser. No. 386,176
Int. Cl.³ D05B *73/10*
U.S. Cl. 112—260 **6 Claims**



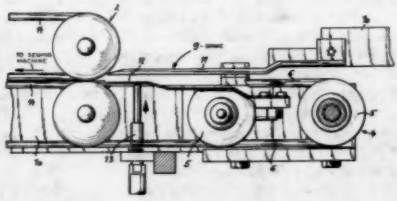
1. A convertible bed sewing machine comprising a bracket arm extending from an upright standard to a depending head, a bed which supports the standard and includes as a part thereof a free arm which extends under the bracket arm and head, a fixed machine supporting leg extending substantially parallel to the free arm at the rear of the machine, a rear bed extending member for the free arm, a cover member fitted over the leg and having the rear bed extending member pivoted thereon for movement into and away from a position wherein a working surface on the extension is coplanar with a working surface on the free arm, the cover and rear bed extending member being removable as a unit from the machine supporting leg to provide space for an attachment, and means for securing an embroidery attachment to the free arm when the cover and rear bed extending member have been removed from the machine.

4,421,044

AUTOMATIC METHOD AND APPARATUS FOR FEEDING A TEXTILE PIECE TO A SEWING MACHINE

Johannes Freermann, and Dieter Malcherek, both of Ochtrup, Fed. Rep. of Germany, assignors to Carl Schmale KG, Ochtrup, Fed. Rep. of Germany

Filed Mar. 16, 1982, Ser. No. 358,813
Int. Cl.³ D05B *97/00, 27/16*
U.S. Cl. 112—262.3 **10 Claims**



1. A method of feeding a textile piece having a nonstraight edge to a stitching location, said method comprising the steps of:

gripping said piece at an interior location spaced from said edge;

advancing said interior gripped location at an intermediate transport speed in a transport direction parallel to said edge toward said stitching location, whereby relative to said direction said edge has a leading portion and a trailing portion that are successively displaced past a speed-change location;

advancing said leading portion of said edge in said direction toward said stitching location at a relatively slow transport speed slower than said intermediate speed; and

advancing said trailing portion of said edge in said direction toward said stitching location at a relatively fast transport speed faster than said intermediate speed.

4. An apparatus for feeding a textile piece having a nonstraight edge to a stitching location, said apparatus comprising:

inner conveyor means for gripping said piece at an interior location spaced from said edge and for advancing said interior gripped location at an intermediate transport speed in a transport direction parallel to said edge toward said stitching location, whereby relative to said direction said edge has a leading portion and a trailing portion that are successively displaced past a speed-change location;

brake means for advancing said leading portion of said edge in said direction toward said stitching location at a relatively slow transport speed slower than said intermediate speed; and

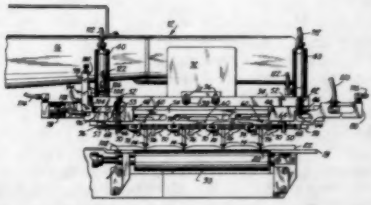
outer conveyor means for advancing said trailing portion of said edge in said direction toward said stitching location at a relatively fast transport speed faster than said intermediate speed.

4,421,045

AUTOMATED THREAD TRIMMING APPARATUS FOR USE FOR SEWING MACHINES

Mario Portilla, 1975 Troy Ave., Brooklyn, N.Y. 11234

Filed May 5, 1982, Ser. No. 374,998
Int. Cl.³ D05B *65/04*
U.S. Cl. 112—288 **13 Claims**



1. A thread trimming apparatus for use with a sewing machine having at least one needle, said needle being operative to produce an array of stitches, said apparatus for severing said array of stitches, said apparatus comprising:

a frame means;

first and second blade mounting means slidably connected to said frame means and in slidable relationship with each other;

positioning means connected to said sewing machine and said frame means for selectively moving said frame means with respect to said sewing machine and towards or away from said array of stitches;

a pair of opposed blade means for each said needle, each said pair comprising a first blade means mounted on said first blade mounting means and a second blade means mounted on said second blade mounting means;

blade actuating means for selectively generating slidable movement of said first and second blade mounting means relative to each other and relative to said frame means; and

control means for actuating said positioning means and said

blade actuating means, said control means being operative to cause said positioning means to move said frame means toward said array of stitches and to cause said blade actuating means to generate slidable movement between said first and second blade mounting means such that each said pair of blade means straddles and severs one said array of stitches, and after which said positioning means moves said frame means away from each said array of stitches.

4,421,046

THREAD CUTTER ASSEMBLY IN SEWING MACHINE

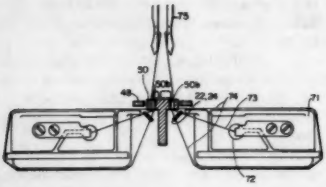
Minoru Morita, Nagoya, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 20, 1981, Ser. No. 236,413

Claims priority, application Japan, Feb. 21, 1980, 55-20857; Nov. 21, 1980, 55-164864

Int. Cl.³ D05B *65/00*

U.S. Cl. 112—292 **21 Claims**



1. A thread cutter mechanism for a two-needle sewing machine comprising first and second cutter assemblies, one of said cutter assemblies being disposed on each side of a feed dog of said sewing machine, each of said assemblies comprising:

a movable edge reciprocably mounted with respect to said stationary edge for cutting a needle thread and a bobbin thread when engaged with said stationary edge, said movable edge and said stationary edge being mounted slantingly with respect to a horizontal plane so that first ends of said stationary edge and said movable edge are higher than second ends thereof in a vertical section perpendicular to the direction of movement of said movable edge;

a rotary hook assembly;

a thread cutting cam coupled to be driven in response to rotation of a rotary shaft securing said rotary hook assembly, said rotary shaft being adapted to drive said rotary hook assembly;

a thread cutting link mechanism comprising a movable edge mounting plate to which said movable edge is fixedly secured, a guide for supporting and guiding said movable edge mounting plate in a plane parallel to a direction of movement of a feed dog of said sewing machine and with said movable edge disposed between said feed dog and said movable edge mounting plate, and an end portion on which a cam follower engageable with said thread cutting cam is provided, said thread cutting link mechanism being operatively coupled for driving said movable edge in response to movement of said thread cutting cam; and

engagement control means for controlling the engagement and disengagement of said thread cutting cam and said cam follower according to a thread cutting instruction.

4,421,047

UPPER FEED DOG DEVICE

Adriano Alberti, Pavia, Italy, assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Nov. 9, 1981, Ser. No. 319,858

Claims priority, application Italy, Jun. 2, 1981, 22098 A/81

Int. Cl.³ D05B *27/06*

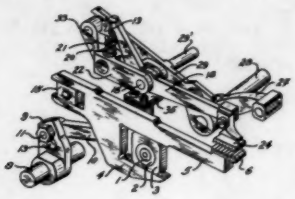
U.S. Cl. 112—311 **6 Claims**

1. An upper feed dog device for sewing machines of the type having a needle, pressure foot, trimming blade and a main feed bar for supporting and moving a main lower feed dog through a rectangular pathway and an oscillatably driven shaft for controlling the machine's trimming blade and presser foot, said upper feed dog device comprising:

(a) a support (35) fixed on and for movement with the main feed bar;

(b) an upper feed dog carrier arm (18) piovotably mounted on said support (35) having:

(i) an upper feed dog (24) fixed on one end thereof;



(c) a control arm (22) pivotably mounted on said support (35) adjacent said upper feed dog carrier arm (18);

(d) means connected to one end of said control arm (22) for oscillating the same on said support (35); and

(e) means for transmitting the oscillating movement of said control arm (22) to said upper feed dog carrier arm (18) for actuating said upper feed dog (24).

4,421,048

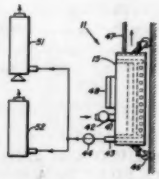
SITU INCINERATION/DETOXIFICATION SYSTEM FOR ANTIFOULING COATINGS

Carl M. Adema, Mayo, and Paul Schatzberg, Annapolis, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 22, 1981, Ser. No. 313,557

Int. Cl.³ B63B *59/06*

U.S. Cl. 114—222 **12 Claims**



1. A method of removing and detoxifying organotin antifoulants from marine antifouling coatings having a thickness of between about six and fifteen mils comprising the steps of:

moving an infrared heating unit across an antifouling coating region of the hull surface so that a power density is applied to the coating region of between about 110 watts/-square centimeter and about 140 watts/square centimeter for between about 7.5 seconds to about 4.0 seconds respectively, thereby raising the temperature of the coating above 800° F.;

collecting the gasses and vapors given off from the heated coating region; and

treating the collected gasses and vapors to remove toxic substances therefrom prior to passing the collected gasses and vapors to the environment.

4. An electrical paint stripping apparatus for removing organometallic antifouling coatings from a ship surface comprising:

a housing designed to be supported adjacent to the coated surface;

a heating chamber formed in the housing and having an

opening therefrom so that heat generated in the heating chamber is directed toward the coated surface;

a plurality of elongated electrical heating elements positioned in the heating chamber in spaced apart relationship for generating a power density within the chamber above 110 watts per square centimeter;

a plenum chamber formed in the housing for supplying cooling air to the electrical heating elements;

a ceramic separator element positioned between the plenum chamber and the heating chamber for reducing the transfer of thermal energy therebetween and for reflecting thermal energy into the heating chamber, the ceramic separator element is provided with a plurality of passages extending therethrough for permitting the flow of cooling air from the plenum chamber to the heating elements in the heating chamber;

a plurality of elongated tubular mounting brackets projecting through the separator element for supporting the end portions of the elongated heating elements and for supplying cooling air to the heating elements in the heating chamber;

an air inlet connected to the housing and communicating with the plenum chamber;

blower means connected to the air inlet for supplying air to the plenum chamber;

a circumferential exhaust chamber surrounding the heating chamber and communicating therewith for receiving exhaust gasses from the heating chamber;

an exhaust conduit connected to the exhaust chamber;

an exhaust blower means connected to the exhaust conduit for drawing exhaust gasses from the exhaust chamber; and

an exhaust gas treatment means connected to the exhaust conduit for treating the exhaust gasses to remove toxic substances therefrom prior to passing the gasses to the environment.

4,421,049

SUBMERGED DEVICE, CARRYING OCEANOGRAPHY APPARATUSES, WITH AUTOMATIC DEPTH CONTROL

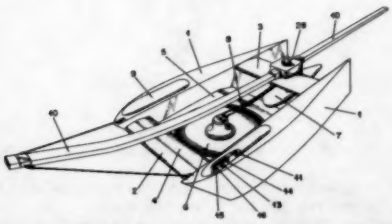
Jacques Cholet, L'Etang la Ville, France, assignor to Institut Francais du Petrole, Rueil-Malmaison, France

Continuation of Ser. No. 925,243, Jul. 17, 1978, abandoned. This application Oct. 27, 1980, Ser. No. 200,867

Claims priority, application France, Jul. 18, 1977, 77 22182

Int. Cl.³ B63B *21/56*

U.S. Cl. 114—245 **12 Claims**



3. A support device for carrying at least one oceanography apparatus, said support device adapted for being towed from a ship at an automatically controlled submerged depth and having connecting means for being connected to the ship, said support device comprising:

at least one assembly of two spaced apart closed hulls, said hulls extending longitudinally parallel and connected to each other, said hulls having a greater volume top portion for providing said support device with a center of buoyancy substantially above its center of gravity and having its greatest width at the top portion thereof and tapering downwardly and rearwardly to have a smaller volume and lesser width, relative to said top portion, at the lower and rearward portion thereof, said top portion being substantially flat at the top surface thereof;

a first connecting element located between said two spaced apart hulls at the front thereof connecting said two spaced apart hulls together, said first connecting element having a substantially airfoil shape and comprising a first front portion and a second rear portion with the first portion being fixed and the second portion being pivotally connected for pivotal movement about its connecting axis for varying the submerged depth of said support device;

control device means mounted in each of said two hulls and connected to said first connecting element for automatically controlling the pivotal movement of said second rear portion of said first connecting element;

at least one secondary connecting element having a substantially airfoil shape for stabilizing said support device and reducing drag thereon when being towed; and

said connecting means located toward the rear of said support device relative to said at least one secondary connecting element for being connected to a single line, said single line being a single unit containing control lines therein for simultaneously controlling said at least one oceanographic apparatus and towing said support device.

4,421,050

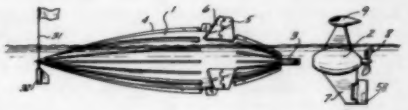
CARGO TORPEDO

Friedrich Weinert, 219-19-131st Ave., Jamaica, Queens, N.Y. 11413

Continuation-in-part of Ser. No. 273,457, Sep. 23, 1970, abandoned. This application Jul. 19, 1982, Ser. No. 399,497

Int. Cl.³ B65D *89/10*

U.S. Cl. 114—256 **3 Claims**



1. A cargo vessel system comprising a floating semi-submerged hull and a prime mover vessel; said hull being rotatable about its longitudinal axis and including stud means centralized at the stern thereof; said prime mover vessel including an opening at its bow adapted to matingly receive said stud means to couple said hull to said prime mover vessel; said rotatable hull including a plurality of remote-controlled fins installed around the circumference of the hull; and control means for selectively adjusting the angle of attack of said fins such that in a first position the fins create a turning moment to rotate the hull by the forward motion of the hull while in a second position the fins create a stabilizing force to prevent the hull from rotating.

4,421,051

AUXILIARY BOOM FOR EMERGENCY EVACUATION

Dillard S. Hammett, Dallas, Tex., assignor to Sedco, Inc., Dallas, Tex.

Filed Oct. 29, 1979, Ser. No. 88,761

Int. Cl.³ B63B *35/00*

U.S. Cl. 114—264 **12 Claims**

1. A method for erecting a temporary walkway between a marine service vessel equipped with a revolving crane having a main boom and an offshore oil platform comprising the steps of:

attaching a first walkway to said main boom;

mounting an extendable, articulating auxiliary boom to said main boom, said auxiliary boom including an extendable walkway;

maneuvering said service vessel into a position proximate said drilling platform;

positioning said auxiliary boom on said platform while sub-

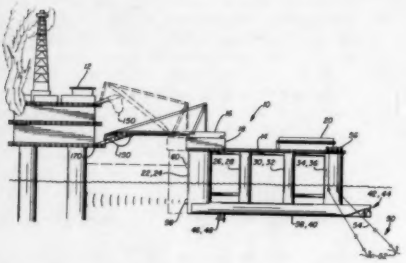
stantially maintaining the position of said service vessel with respect to said platform.

2. A self-propelled vessel for servicing an offshore oil platform comprising:

means for maintaining said vessel at a predetermined position with respect to said platform;

a revolving crane mounted on said vessel for rotation about a vertical axis, said crane including a base and a main boom pivotally mounted for rotation about a horizontal axis;

an auxiliary boom mounted on said main boom and including means permitting articulation of said auxiliary boom with respect to said main boom;



said auxiliary boom comprising an articulating section having a pair of pivotally-connected subsections, and an adjoining section operably engaging said articulating section, and capable of translating with respect thereto;

first walkway means forming a passageway for personnel on said main boom; and

second walkway means forming a passageway for personnel on said auxiliary boom and cooperating with said first walkway means to form a passageway for personnel between said vessel and said platform when the auxiliary boom is rested on the platform.

4,421,052

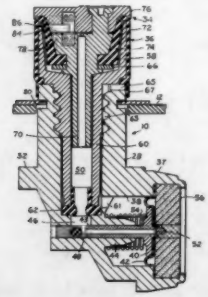
TIRE PRESSURE SIGNALLING DEVICE

Edward J. Cook, South Hamilton, Mass., assignor to Safety Research & Engineering Corp., North Reading, Mass.

Filed Jun. 9, 1980, Ser. No. 157,897

Int. Cl.³ B60C *23/04*

U.S. Cl. 116—34 R **5 Claims**



1. A tire pressure warning device for use with a wheel having a pneumatic tire mounted thereon, comprising

(a) a body mountable to said wheel and formed with a cylindrical chamber the axis of which is perpendicular to the radius of said wheel when mounted thereto,

(b) said body mountable to said wheel with at least a portion thereof exterior to said wheel,

(c) a piston mounted to said chamber for movement along said axis and responsive to pressure in said tire,

(d) acoustical signal generating means in said body and communicating with said exterior portion of said body,

(e) conduit means in said device forming an air flow passage from the interior of said tire to said signal generating means, one portion of said passage being generally parallel to said axis and another portion being perpendicular thereto,

(f) said piston being operatively associated with said conduit means and adapted to close said passage at different tire pressure conditions and to open said passage at another operative position related to an abnormal tire pressure condition,

(g) resilient means operatively associated with said piston and urging said piston into one of the closed positions thereof,

(h) said acoustical signal generating means being formed with at least one outlet port in the exterior portion of said body for the emission of an acoustical signal therefrom, and,

(i) a resilient cap mounted to said body, said cap including one portion fixed to said body and another portion movable with respect to said one portion and to said body, said other portion normally covering said outlet port and movable away from said port in response to the flow of air in said passage and returning to cover said port when said flow of air is stopped.

4,421,053

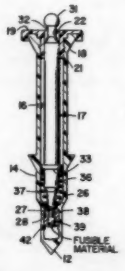
TWO-STAGE POP UP THERMOMETER

Anthony J. Volk, P.O. Box 943, Turlock, Calif. 95380

Filed Dec. 18, 1981, Ser. No. 331,985

Int. Cl.³ G01K *11/06*

U.S. Cl. 116—218 **9 Claims**



1. An improved disposable cooking thermometer comprising

an elongated barrel having a central longitudinal bore with an open rear end and a closed front end,

said barrel having a reduced interior cross-section adjacent the front end thereof forming a neck separating a front internal cavity from the remainder of the bore with said neck having a lesser cross-sectional opening than said bore and cavity and said neck tapering laterally outwardly to said cavity,

an elongated indicator stem having a flange and slidably disposed substantially entirely within said barrel and having a first reduced stem portion below said flange and a second reduced stem portion below said first stem portion and terminating in an enlarged portion at an inner stem end that is disposed entirely within said cavity abutting the inner end thereof,

a spring within said barrel engaging said flange on said stem

and an internal shoulder for urging said stem from the rear end thereof, and

a fusible material having a predetermined melting temperature disposed in said barrel cavity about said inner stem end and the second reduced cross-section of said stem for holding said stem in said barrel until said fusible material reaches a predetermined temperature whereat said stem is extended from the rear end of the barrel.

4,421,054

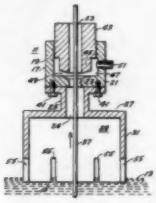
APPARATUS FOR PREVENTING SURFACE BLEMISHES ON ALUMINUM-ZINC ALLOY COATINGS

Anthony J. Stavros, Bethlehem, Pa., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.

Division of Ser. No. 139,607, Apr. 11, 1980, Pat. No. 4,310,572. This application Oct. 13, 1981, Ser. No. 310,596

Int. Cl.³ B05C *11/06*

U.S. Cl. 118—63 **14 Claims**



1. An improved apparatus for wiping and protecting linear material passing from a molten metallic aluminum-zinc coating bath comprising:

(a) a gas wiping die which wipes the linear material as it passes from the molten bath with a protective non-oxidizing gas,

(b) a containment means for protective gas surrounding the linear material as it leave the molten bath and positioned adjacent to the gas wiping die such that protective non-oxidizing gas is discharged from the gas wiping means into the containment means, and

(c) orifice means in the containment means adjacent to the surface of the molten bath through which protective gas is discharged from the containment means carrying with it metallic zinc particles which might otherwise settle upon the surface of the molten bath within the containment means.

4,421,055

APPARATUS FOR TREATING FILTER MATERIAL

Hugh M. Arthur, High Wycombe, England, and Francis A. M. Labbe, Neuilly-sur-Seine, France, assignors to Molins Limited, London, England

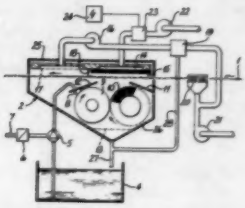
Filed Jul. 16, 1980, Ser. No. 169,358

Claims priority, application United Kingdom, Jul. 17, 1979, 7924869

Int. Cl.³ B05C *5/00, 15/00*

U.S. Cl. 118—620 **27 Claims**

1. Apparatus for treating filter material, including means defining a path for filter tow, a chamber through which said path passes, means for supplying fluid additive including means for directing additive towards the path for the tow in a first direction in said chamber, means for causing an air flow to direct additive towards the tow in a second direction in said chamber, said air flow means comprising an intercepting plate located closely adjacent to and extending substantially across the entire width of said tow path, said plate being air permeable and forming the boundary of an air pressure manifold, whereby said plate is arranged to intercept fluid additive



which has penetrated the tow and to diffuse said air flow to disperse and propel said intercepted additive towards the tow.

4,421,056

NOZZLE FOR APPLYING A LIQUID TO THE INTERMEDIATE IMAGE CARRIER OF AN ELECTROPHORETIC PRINTER

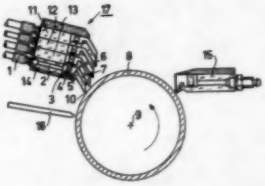
Franz Schinke, Hamburg, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 11, 1982, Ser. No. 357,246

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1981, 3111893

Int. Cl.³ G03G *15/01*

U.S. Cl. 118—645 **8 Claims**



1. An apparatus for applying liquid to an intermediate image carrier of an electrophoretic printer comprising the combination of an intermediate image carrier of an electrophoretic printer, said image carrier being movable in a given direction, a nozzle for applying liquid, in particular a toner suspension or a cleaning liquid, to a surface of said image carrier, said nozzle comprising inlet means for said liquid and discharge means for said liquid, the discharge means having a width larger than the diameter of the inlet means, said nozzle being positioned sufficiently close to said image carrier so as to provide a narrow gap (**10**) between said nozzle and said surface, and at least one electrode positioned in the vicinity of the surface of said image carrier for applying a static charge to said surface prior to the application of liquid from said nozzle to said surface, characterized in that said nozzle comprises, viewed in the direction of the movement to said surface, an inlet means for receiving liquid from a supply thereof, a front chamber (**3**), having a width corresponding to the width of the intermediate image carrier for receiving liquid from said inlet means, passage means for providing access for flow of said liquid between said inlet means and said front chamber (**3**), a rear chamber (**5**), having a width corresponding to the width of the intermediate image carrier located in front of said front chamber (**3**) in the direction of said liquid flow, a plurality of bore means (**4**) for providing access for flow of said liquid from said front chamber (**3**) to said rear chamber (**5**), the diameter of each of said bore means (**4**) being smaller then the widths of said chambers, said rear chamber (**5**) being situated near said discharge means and separated from said discharge means by a raised overflow

edge (6), the height of said overflow edge (6) being higher than that of said bore means (4), said discharge means comprising an inclined surface (7) extending from said rear chamber (5) in the direction of said surface of said image carrier and terminating sufficiently close to said surface to provide a narrow gap (10) between said surface of said intermediate image carrier and said inclined surface (7), and each of said front chamber (3), said rear chamber (5), said overflow edge (5) and said inclined surface (7) extending across the entire width of the surface of said intermediate image carrier.

4,421,057

DEVELOPING APPARATUS FOR ELECTROSTATIC IMAGE

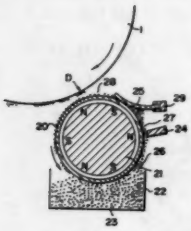
Nagao Hosono, Shizuoka; Koichi Kinoshita, Narashino, and Toru Takahashi, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 261,771, May 28, 1981, Pat. No. 4,386,577, which is a continuation of Ser. No. 938,494, Aug. 31, 1978, abandoned. This application Jan. 18, 1982, Ser. No. 340,464

Claims priority, application Japan, Sep. 10, 1977, 52-109240; Sep. 10, 1977, 52-109241

Int. Cl.³ G03G *15/09*

U.S. Cl. 118—657 **3 Claims**



1. A developing apparatus for developing with power developer, comprising:

a movable developer supporting member provided in facing relationship with a movable image carrying member in a developing station; and

means for forming a thin layer of powder developer on said movable developer supporting member;

the image carrying member and said developer supporting member being spaced apart in the developing station by a predetermined distance, said developer supporting member and the image carrying member being moved in the developing station in the same direction and at substantially the same peripheral speeds, and said forming means having a magnetic field generating means and a developer limiting member opposed to such magnetic field generating means and located within the range of the magnetic field therefrom, said forming means being effective to form the developer layer with a thickness smaller than said predetermined distance between the image carrying member and said developer supporting member in the developing station.

4,421,058

CAT PORTS

Graham R. Paul, 29 Haliburton Rd., Twickenham, Middlesex, England

Filed Mar. 7, 1979, Ser. No. 18,009

Claims priority, application United Kingdom, Mar. 8, 1978, 9164/78; May 30, 1978, 9164/78

Int. Cl.³ E06B *3/32*

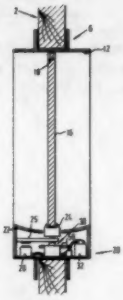
U.S. Cl. 119—19 **8 Claims**

1. A cat port comprising:

(a) a framework defining an opening through which a small animal must pass to gain access to, or exit from a designated area, and

(b) a flap mounted on the frame within said opening for pivotal movement in both directions from a closed position in which the flap substantially closes the opening, the cat port comprising means for controlling movement of the flap from its closed position, said means comprising:

(i) catch means mounted on the frame and which is movable between an operative position in which it restrains pivotal movement of the flap in at least one of said directions and an inoperative position in which such pivotal movement is permitted, and



(ii) operating means mounted on the frame and which may be rendered operative under the action of a first permanent magnet carried by the small animal on movement thereof into close proximity with the cat port to move the catch means to its inoperative position, said operating means comprising a reed switch mounted on the frame, a second permanent magnet mounted adjacent to said switch, the relative dispositions of the reed switch and the second permanent magnet being adjustable to vary the operating threshold of the switch and there is provided a re-setting means to render the read switch inoperative subsequent to activation of said switch.

4,421,059

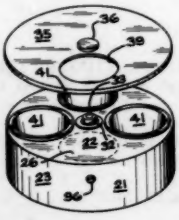
AUTOMATIC CAT FEEDER

Bernard A. Cousino, Fort Myers, Fla., assignor to Cousino Corporation, Ft. Myers, Fla.

Filed Dec. 21, 1981, Ser. No. 332,660

Int. Cl.³ A01K *5/02*

U.S. Cl. 119—51.12 **1 Claim**



1. A cat feeder, comprising, a housing having a top, said top defining a plurality of spaced feed positions, feed cups located at said spaced feed positions, a rotatable cover overlying such top and having a feed opening for indexing with one of said feed positions, a drive member connected to said cover for sequentially rotating said cover at predetermined time intervals, said drive member includes a plurality of radially spaced stops and said control means includes a solenoid assembly

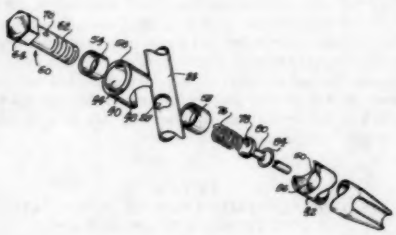
having a plunger arm which engages said stops, whereby actuation of said solenoid disengages said plunger arm from said stop allowing rotation of the drive member and the cover, spring means for rotating said drive member, said spring means comprise a pair of tension springs operatively connected to said drive member, control means for actuating said spring means, and said control means includes a timer for actuating said solenoid at predetermined time intervals, sound means operatively connected to said drive member whereby said sound is actuated upon rotation of said drive member and said cover, said control means includes a battery power supply, a switch assembly mounted adjacent said drive member and a switch actuator on said drive member for engagement with said switch assembly, whereby upon rotation of said cover to the last feed position, said switch actuator engages said switch assembly to open the electrical circuit to said battery power supply.

4,421,060

NIPPLE WATERER

Don R. Frush, Warsaw, Ind., and Keith B. Coffman, Harrisonburg, Va., assignors to Chore-Time Equipment, Inc., Milford, Ind.

Filed Sep. 23, 1981, Ser. No. 304,843
Int. Cl.³ A01K *7/06, 39/04*
U.S. Cl. 119—72.5 **17 Claims**



12. A watering system including a tubular manifold having a hollow interior and a valve waterer for interfitting with the tubular manifold, the valve waterer including two body elements, each body element having an arcuate face adapted to engage the tubular manifold, fastener member means extending through one body element, through the tubular manifold and manifold interior, and into another body element for drawing the valve elements toward one another around the tubular manifold, at least one fluid flow path being defined in the fastener member and extending from the tubular manifold interior to the interior of one body element for delivering fluid from the manifold interior to that body element.

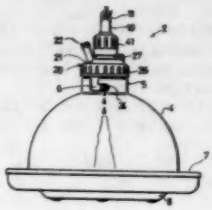
4,421,061

SUSPENSION-TYPE POULTRY DRINKING FOUNTAIN

Yair Shomer, Kibbutz Maagan Michael D.N. Menashe, Israel, assignor to Plasson Maagan Michael Industries Ltd., Kibbutz Maagan Michael, D.N. Menashe, Israel

Filed Aug. 30, 1982, Ser. No. 412,896
Claims priority, application Israel, May 14, 1982, 65778
Int. Cl.³ A01K *7/00*
U.S. Cl. 119—81 **14 Claims**

1. A suspension-type poultry drinking fountain comprising a hanger assembly adapted to be supported in suspension, and a bowl supported by said hanger assembly and containing a water trough for receiving water to be made available for drinking by the poultry; characterized in that said hanger assembly comprises a water inlet and a tubular water outlet projecting laterally of the hanger assembly, and the upper end of said bowl includes a slot forming with said tubular water outlet a bayonet-pin-and-socket connection permitting quick



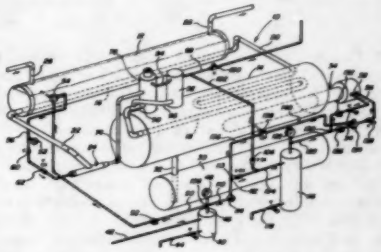
attachment and detachment of said bowl with respect to this hanger assembly.

4,421,062

WELL GAS POWERED WELL EFFLUENT HEAT TREATING SYSTEM

Isaac F. Padilla, Sr., 4910 S.S. River Rd., Farmington, N. Mex. 87401

Filed Oct. 21, 1982, Ser. No. 435,885
Int. Cl.³ F27B *33/18*
U.S. Cl. 122—1 R **11 Claims**



6. A well effluent heat treating system including a well effluent tank, a heat exchange fluid tank, heat exchange means including a closed loop liquid flow path having heat exchange means in each of said tanks, gas pressure operated pump means for pumping a heat exchange liquid through said flow path, gas burner means for said heat exchange fluid tank, well pressurized gas supply means, first gas delivery means operatively connecting said gas supply means to said pump through a thermostat valve operative to sense the need for heating said well effluent tank, a gas burner for heating said heat exchange fluid tank, second gas delivery means for supplying gas being discharged from said pump to said burner and including a gas operated control valve and third gas delivery means for delivering gas from said supply means to said control valve, said third gas delivery means including a thermostat operated valve responsive to a demand for heating said heat exchange fluid tank.

11. The method of treating well effluent including oil, water and gas supplied to a closed effluent tank including a gas outlet, said method including providing a heat transfer liquid tank and a closed heat transfer liquid loop flow path including heat exchange portions disposed within said effluent tank and heat transfer liquid tank, pumping a heat transfer liquid through said flow path responsive to a demand for heating said effluent tank and through the utilization of a gas pressure eductor pump serially connected into said flow path, separating the eductor pump gas discharge from the heat transfer liquid within said flow path and communicating said gas discharge with a burner means for heating said heat transfer liquid tank through a gas operated control valve to which gas is supplied from said gas

discharge through a thermostat operative to sense a need for heating said heat transfer liquid tank.

4,421,063
FLUIDIZED BED COMBUSTION APPARATUS

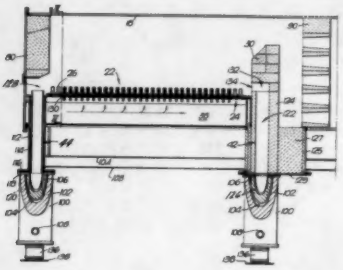
Ronald B. Stuart, Dalbeattie, and Alan G. Troup, Annan, both of Scotland, assignors to Northern Engineering Industries plc, Newcastle upon Tyne, England

Filed Nov. 27, 1981, Ser. No. 325,599

Claims priority, application United Kingdom, Jan. 9, 1981, 8100563

Int. Cl.³ F23C *11/02*

U.S. Cl. 122—4 D **4 Claims**



1. Fluidised bed combustion apparatus comprising a horizontal furnace duct, containment means within said duct, particulate inert fluidisable bed material forming a fluidisable bed in said containment, first means operable to feed particulate solid fuel to said bed in said containment means through a first upstream end of said duct, second means operable to feed air into said bed to fluidise the same, a combustion chamber into which said duct opens at a second downstream end thereof, horizontal firetubes conducting gaseous products of combustion of said fuel from said combustion chamber outside said duct, said firetubes and said combustion chamber forming with said duct a path for gas leaving said containment, said containment comprising a base for supporting said bed, said second means comprises nozzles upstanding from said base, each said nozzle defining fluidizing fluid outlets therefrom within said containment but spaced above said base thereof, whereby material of said bed only in an upper zone thereof extending above said fluid outlets is fluidized and material of said bed in a lower zone thereof intermediate said upper zone and said base and overlying the latter is left quiescent, first conduit means which have open upper end means in said containment above said base and which pass downwardly out of said duct, means operable to conduct coolant water in non-contacting heat-exchange relationship with material removed from said bed by said first conduit means, second conduit means leading from said path downstream of said containment, screening mechanism to which said first and second conduit means lead, conveyor means in material receiving relationship with said screening mechanism, said mechanism being operable to separate materials into a first class of relatively larger particles and a second class of relatively smaller particles including inert bed material and to convey said second class back to said containment.

4,421,064
HEATING BOILER

Alpo S. Lehtinen, Tanokas, 32610 Vampula, Finland

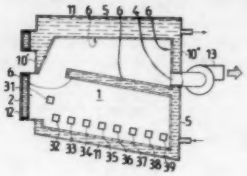
Filed Oct. 23, 1981, Ser. No. 314,739

Claims priority, application Finland, Oct. 27, 1980, 803363

Int. Cl.³ F22B *31/04*

U.S. Cl. 122—15 **3 Claims**

1. A heating boiler comprising top, bottom, front, rear and side walls, at least certain of said walls being formed to retain water to be heated, said walls defining a combustion chamber for receiving fuel to be burned therein and said front wall having an aperture and cooperating door for introducing said fuel into said chamber, a flue communicating with said combustion chamber, air guiding means for introducing air into said chamber for burning of said fuel, and means for operating said air guiding means for displacing the point of air entry into said combustion chamber to effect burning of said fuel in successive zones at predetermined time intervals, said air guiding means comprising a plurality of apertures in at least one wall of said boiler spaced throughout the length of the fuel combustion zone of said chamber and the last said means including valves



coupled with each of said apertures and means for successively opening and closing each of said apertures in succession to effect burning of said fuel in successive zones throughout the length of the combustion zone, the last said means being operable to first deliver air to the first of said apertures at one edge of the combustion zone, then after the fuel adjoining said first aperture is burned the last said means opens the valve controlling the air to the second aperture and when maximum air flow through the second aperture is achieved the last said means closes the first aperture and the operation of the last said means continues in like manner until burning has been proceeded throughout the combustion zone.

4,421,065
HEATING EQUIPMENT FOR AN INSTALLATION USING STEAM AND HEATED GAS

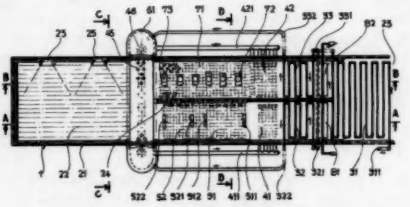
Jean Tillequin, Paris, France, assignor to Creusot-Loire, Paris, France

Continuation of Ser. No. 100,219, Dec. 4, 1979, abandoned. This application Nov. 20, 1981, Ser. No. 323,630

Claims priority, application France, Dec. 6, 1978, 78 34357

Int. Cl.³ F22B *7/00*

U.S. Cl. 122—155 R **11 Claims**



1. Heating apparatus for use with an installation using steam and hot gas and including a combustion chamber (22) out of which waste gases pass which circulate within an enclosure (21) and during their passage provide heating of a bundle of vaporizer tubes (41, 42, 45), which supply water vapor to a bundle of super-heating tubes (51, 52) which provide superheated steam and a bundle of tubes (71) in which a gas furnished by an exterior source of gas circulates, said vaporizer tubes (45) being located upstream of said bundle of tubes (71), said apparatus comprising a partition (24) which divides said enclosure into two chambers so as to separate two flows of

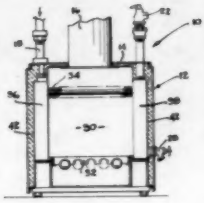
waste gases, one of said chambers containing said bundle of tubes (71) in which said gas circulates and the other of said chambers containing at least one bundle (51, 52) of super-heating tubes which are supplied with dry steam damper means (81, 82) being provided on each side of said partition for controlling the flow of the waste gases through each of said chambers.

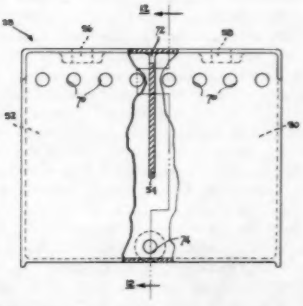
4,421,066

HIGH EFFICIENCY BOILER

Manochehr Gordbegli, Santa Ana, Calif., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Filed Feb. 16, 1982, Ser. No. 348,934
Int. Cl.³ F22B *15/00*
U.S. Cl. 122—264 **1 Claim**





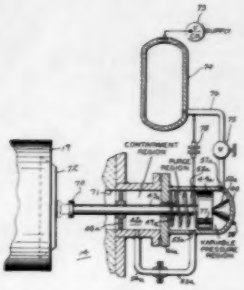
1. A boiler comprising a housing; a combustion chamber in the housing; a burner situated at the bottom of the chamber; a horizontal heat exchanger including a plurality of hollow tubes positioned horizontally within the chamber; a first vertical heat exchanger including a water reservoir and positioned to form a first vertical wall of the combustion chamber and further including a hollow body which extends from a first end of the hollow tubes to the burner, a vertical partition wall within the body which extends the length of the body to divide the interior of the first vertical heat exchanger into first and second cavities, and means for connecting the first end of some of the hollow tubes to communicate with the first cavity and the first end of the remainder of the hollow tubes to communicate with the second cavity; and a second vertical heat exchanger including a water reservoir and positioned to form a second vertical wall of the combustion chamber and further including a hollow body which extends from a second end of the hollow tubes, means for connecting the second ends of the hollow tubes to communicate with the interior of the second vertical heat exchanger, a second vertical partition wall within its hollow body which extends a portion of the length of the body to divide the second vertical heat exchanger into two cavities which communicate with each other, where the second vertical partition wall extends from the top of the hollow body a length sufficient to ensure that a substantial amount of water flowing into one of the cavities reaches the bottom of the hollow body before entering the other cavity, and further includes a slot through the second vertical partition wall adjacent the top of the hollow body to permit the rapid escape of trapped air from the boiler.

4,421,067

APPARATUS AND METHOD FOR SOOT CLEANING IN HIGH-PRESSURE HEAT EXCHANGERS

Robert J. Krowech, Minneapolis, Minn., assignor to Deltak Corporation, Minneapolis, Minn.

Filed Sep. 7, 1982, Ser. No. 415,318
Int. Cl.³ F22B *37/52*; F28G *9/00*
U.S. Cl. 122—390 **20 Claims**



1. Soot cleaning apparatus, which is operable with a source of a pressurized blowing medium, and which is adapted to seal an opening into a heat exchanger vessel, the opening leading into a chamber in which a heat transfer structure is positioned in a volume of a pressurized gas, the apparatus comprising:

a movable cleaning head adapted to be positioned in the chamber proximate the heat transfer structure for dislodging soot therefrom during a cleaning operation in which the cleaning head is moved between a first position and a second position; and

a pneumatic actuator adapted to be fixed to the vessel around the opening, the actuator having

a pressure cylinder that communicates at one end with the vessel chamber,

a piston disposed in the cylinder between a containment region that communicates with the vessel chamber, and a variable pressure region that is on an opposite side of the piston from the containment region,

a connecting rod that couples the piston to the movable cleaning head, and

means for admitting into the variable pressure region of the cylinder, for a timed interval, a blowing medium at greater pressure than the gas in the vessel chamber to generate a force that moves the piston through a forward stroke to move the cleaning head from its first position to its second position.

4,421,068

OPTIMIZATION OF STEAM DISTRIBUTION

Gurcan Aral, Cupertino, Calif., assignor to Measurex Corporation, Cupertino, Calif.

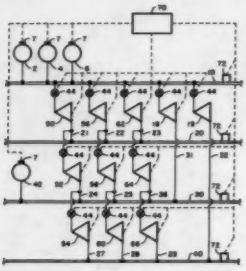
Filed Jul. 6, 1982, Ser. No. 395,408
Int. Cl.³ F22B *37/46*; F22D *5/00*
U.S. Cl. 122—448 B **5 Claims**

1. A process for controlling a steam generation and distribution system which includes a plurality of headers, each of said headers being coupled to steam-using devices which create demands for steam; supply means for supplying steam to each of the headers; and steam transferring devices to transfer steam between headers so that a plurality of paths is formed between the headers, the process comprising:

(a) measuring the pressure at each header;

(b) when the pressure changes from a first predetermined pressure at a first header,

(i) identifying each path beginning at said first header and terminating at a steam supply means;
(ii) identifying each transfer means included in each said path;
(iii) determining the incremental cost associated with each transfer means and with the supply means in each said path;



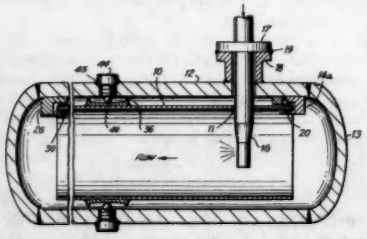
(iv) determining the alteration of selected transfer means and steam supply means in at least one of said paths required to restore the predetermined pressure in said first header at the least total incremental cost;
(c) implementing the required alterations to restore the predetermined pressure in said header.

4,421,069

DESUPERHEATER SPRAY LINER ASSEMBLY

Joseph P. Diggins, Coraopolis, Pa., assignor to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed Sep. 7, 1982, Ser. No. 415,624
Int. Cl.³ F22G 5/12
U.S. Cl. 122—487 **15 Claims**



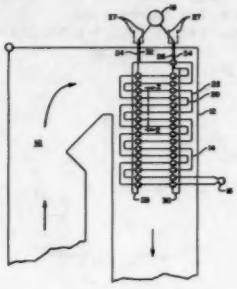
1. A spray liner assembly supported within a pressurizable desuperheater header, comprising:
(a) A cylindrical-shaped metal liner attached and axially retained at one end to a header inner wall by multiple circumferentially spaced support means;
(b) multiple circumferentially spaced support means located at the opposite end of said cylindrical liner for slidably attaching the liner to said header inner wall; and
(c) multiple radial support means located on opposite sides of said liner at an intermediate point along the length of the liner for providing an elastic inward loading to the liner.

4,421,070

STEAM COOLED HANGER TUBE FOR HORIZONTAL SUPERHEATERS AND REHEATERS

Robert P. Sullivan, Chattanooga, Tenn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Jun. 25, 1982, Ser. No. 392,412
Int. Cl.³ F22B 37/24
U.S. Cl. 122—510 **2 Claims**



1. In combination, a vertical gas pass through which hot gases flow, a heat exchanger including a first tube panel having serpentine tube means, each tube means having a plurality of first horizontal tube portions, said heat exchanger having a second tube panel having serpentine tube means, each tube means having a plurality of second horizontal tube portions which lie adjacent to and in the same horizontal planes as the first horizontal tube portions, the upper terminal ends of the serpentine tube means having first vertical runs extending downwardly to a point beneath the bottom of the serpentine tube means, and having U-bends at the bottom, and having second vertical runs, which bend at the top and are integral with and form the upper-most horizontal tube portions, lug means attached to opposite sides of some of the vertical runs, a plurality of band means encircling adjacent first and second horizontal tube portions, the ends of the band means being attached to the lug means, each band means being loose enough to permit relative movement between the two adjacent horizontal tube portions, and also permit relative movement between the vertical run and each of the horizontal tube portions.

4,421,071

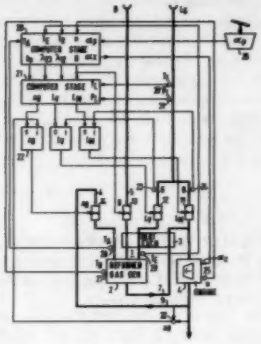
CONTROL METHOD AND CONTROL APPARATUS FOR OPERATING A REFORMED GAS GENERATOR AND AN INTERNAL COMBUSTION ENGINE CONNECTED THERETO

Bernt Paul, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 15, 1978, Ser. No. 933,793
Claims priority, application Fed. Rep. of Germany, Aug. 17, 1977, 2737072; Aug. 19, 1977, 2737531
Int. Cl.³ F02C 43/08
U.S. Cl. 123—1 A **24 Claims**

1. In a method for operating a reformed gas generator, in which liquid fuel is reacted with primary air, at an elevated reactor temperature, to form a reformed gas, and an internal combustion engine connected thereto in which said reformed gas is burned with secondary air, wherein the supply of liquid fuel and total air and the ratio of the primary air stream to the secondary air stream are regulated under steady state conditions to values adapted to the steady state conditions, the improvement comprising, while operating under steady state conditions, after reaching normal operating temperature, upon an increase of the fuel supply, increasing, along with the in-

creased fuel supply, the ratio of the primary air stream to the secondary air stream for a short time, thereby increasing the



reactor temperature for said short time, corresponding the change in time of the fuel supply relative to the steady state condition.

4,421,072

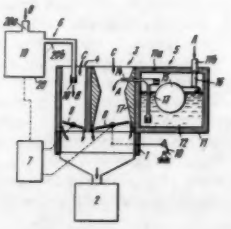
METHOD OF FEEDING CARBURETOR INTERNAL COMBUSTION ENGINE

Anatoly I. Mischenko, ulitsa Lermontovskaya, 14/16, kv. 37; Gennady B. Talda, prospekt Gagarina, 38, kv. 89; Alexandr V. Belogub, Saltovskoe shosse, 250-a, kv. 468; Anatoly N. Podgorny, ulitsa Sumskaya, 118, kv. 14; Alexandr A. Makarov, ulitsa Bairona, 146, kv. 71; Anatoly T. Zhemerenko, ulitsa 2 Pyatiletki, 1b, kv. 81; Anatoly I. Domrachev, Saltovskoe shosse, 141b, kv. 36, and Petr K. Efremov, ulitsa Geroev Truda, 17, kv. 23, all of Kharkov, U.S.S.R.

Filed Dec. 30, 1981, Ser. No. 336,018

Int. Cl.³ F02B *75/12, 7/02*

U.S. Cl. 123—1 A **1 Claim**



1. A method of feeding a carburetter internal combustion engine, which comprises forming a combustible mixture from the flow of a petrol-air mixture and the flow of a hydrogen-air mixture, feeding said combustible mixture to said engine, and controlling the quantities of said mixture components depending on the load on a shaft of said engine by varying the quantity of said petrol-air mixture and the quantity of and component proportions in said hydrogen-air mixture so that resulting combustible mixture fed to said engine contains (by weight %):

at a full load
- petrol—from 5.8 to 6.0
- hydrogen—from 0.14 to 0.17,
- air—from 93.7 to 94.0;

at a load constituting 0.75 of the full load
- petrol—from 4.3 to 4.7
- hydrogen—from 0.19 to 0.22
- air—from 95.2 to 95.5;

at a load constituting 0.5 of the full load
- petrol—from 3.1 to 3.2
- hydrogen—from 0.25 to 0.29
- air—from 96.4 to 96.7;

at a load constituting 0.25 of the full load
- petrol—from 1.8 to 2.0
- hydrogen—from 0.37 to 0.40
- air—from 97.6 to 97.8;

at a load constituting 0.1 of the full load
- petrol—from 1.2 to 1.5
- hydrogen—from 0.42 to 0.45
- air—from 98.1 to 98.4; and at loads lying between said values the quantities of the gasoline, hydrogen and air are varied to obtain quantities lying between said corresponding values.

4,421,073

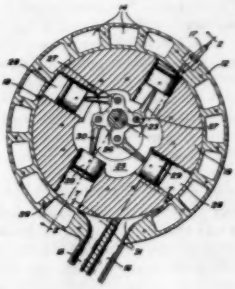
ROTATING CYLINDER INTERNAL COMBUSTION ENGINE

Manuel Arregui, P.O. Box 495-8, Prince Albert, Saskatchewan Province, Canada; Rafael Diaz, 5 St. Charles St., Ile Bizard, Quebec Province, Canada H9C 1L3; Vicente Gamon, 25 - 1° D., and Javier Yarza, 4 - 3°, both of Irun S.S., Spain

Filed Dec. 14, 1981, Ser. No. 330,080

Int. Cl.³ F02B *57/08*

U.S. Cl. 123—43 R **8 Claims**

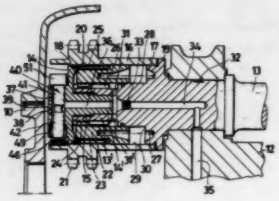


1. An internal combustion rotary engine comprising: a casing defining a cylindrical chamber; a rotor rotatively mounted in the cylindrical chamber, defining a rotor axis, a central chamber and piston chambers communicating with said central chamber, each piston chamber having its longitudinal axis parallel to a radius of said rotor, an output shaft rotatably carried through the casing, freely extending in the central chamber of the rotor, and radially offset relative to the rotor axis; pistons operatively reciprocable in the piston chambers; connecting rods pivotally connected to the pistons and to connecting points carried by and uniformly radially spaced from the axis of said output shaft, bodily rotatable therewith, and angularly advanced in the direction of rotor rotation relative to virtual radial line connections between the axis of the output shaft and the pivotal connections of the connecting rods to the pistons; and a drive train drivingly coupling the output shaft to the rotor and operatively transmitting rotation to the latter and producing concurrent and synchronous rotation of the rotor with the output shaft.

4,421,074
AUTOMATIC TIMING VARIATOR FOR AN INTERNAL COMBUSTION ENGINE

Giampaolo Garces; Ambrogio Banfi, both of Milan, and Michele L. Di Stefano, Limbiate, all of Italy, assignors to Alfa Romeo S.p.A., Milan, Italy

Filed Jul. 21, 1981, Ser. No. 285,614
Claims priority, application Italy, Jul. 31, 1980, 23841 A/80
Int. Cl.³ F01L *1/34*
U.S. Cl. 123—90.15 **3 Claims**

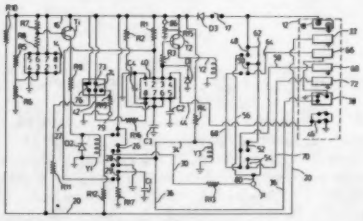


1. A timing variator for an internal combustion engine especially for motor vehicles, said internal combustion engine including intake valves, exhaust valves, two camshafts, a crankshaft, a lubricating circuit, said intake valves being controlled by one of said camshafts and said exhaust valves being controlled by the other of said camshafts, both of said camshafts being provided with a gear for their driving by said engine crankshaft and for their appropriate timing relative to said crankshaft, in the case of at least one of said camshafts the connection to the relative gear being made by means of a mobile drive member constituted by an annular piston seated in a cavity and provided with a first and a second splined coupling, said first splined coupling being engaged with a spline provided on said gear, said second splined coupling being engaged with a spline provided on said one camshaft, at least one of said splines of said two couplings having a helical extension, said one camshaft having an axis and said annular piston being able to undergo axial sliding in the direction of said camshaft axis, said sliding being limited by two limit stop surfaces disposed in an annular cavity between said one camshaft and said gear, said annular piston being urged into and maintained in a first of its two limiting positions by a piston spring having a preload, said cavity in which said piston is housed being in communication by way of a bore of predetermined size with said engine lubricating oil circuit, said cavity being in selective communication with the outside by way of a shut-off slide valve, said shut-off slide valve having a slide valve element which by moving in a direction normal to said camshaft axis can move from a first adjustment position to a second adjustment postion and to a third adjustment position, said slide valve element being rigid with a mass which is eccentric to said camshaft axis, a first small spring and a second small spring each having a preload acting on said slide valve element in its sliding direction so as to urge it into its said first position if the rotational speed of the engine is less than a value n1 at which a centrifugal force due to an eccentric mass carried by said one camshaft balances the preload of said first small spring, whereas at rotational speeds greater than n1 but less than a value n2 which exceeds n1 said centrifugal force exceeds the preload of said first small spring so as to move said slide valve element into its said second position, and furthermore at rotational speeds greater than n2 said centrifugal force also exceeds the preload of said second small spring so as to move said slide valve element into said third position, said slide valve element putting said annular cavity into communication with the outside when in its first adjustment position and when in its third adjustment position, whereas it shuts off the communication between said annular cavity and the outside when in its second adjustment position so as to cause oil under pressure to flow into said cavity in the absence of oil under pressure in said cavity said annular piston being maintained by said piston spring in said first of its two limiting positions whereas when there is oil under pressure in said cavity this oil moves said annular piston into and maintains it in the second of said piston two limiting positions, so that by the effect of said spline helical extension on the annular piston, a first determined timing of said one camshaft relative to said crankshaft is attained at rotational speeds less than said value n1, whereas at rotational speeds greater than n1 and less than n2 a second determined timing is attained, and at rotational speeds exceeding n2 the first timing is again attained.

4,421,075
APPARATUS FOR MAINTAINING A DIESEL ENGINE AT A READY TO START TEMPERATURE

Max Mandel, Willowdale, Canada, assignor to Era Electronics (Canada) Limited, Toronto, Canada

Continuation-in-part of Ser. No. 291,758, Aug. 10, 1981. This application Sep. 7, 1982, Ser. No. 415,500
Int. Cl.³ F02N *17/02*
U.S. Cl. 123—142.5 R **5 Claims**



1. Apparatus for maintaining a diesel engine at a ready to start temperature, the diesel engine comprising an engine block, a starter and fuel supply means, the apparatus comprising electrical means providing a signal varying in accordance with engine block temperature, means responsive to the signal when indicating fall of the engine block temperature to a predetermined low value to actuate the starter for up to a predetermined maximum period of time and to actuate the fuel supply means, means responsive to the attainment of a predetermined oil pressure corresponding to an engine running condition to de-actuate the starter and continue the actuation of the fuel supply means to continue running of the diesel engine, and means responsive to the signal when indicating increase of the engine block temperature to a value which is a predetermined amount higher than said lower value to de-actuate the fuel supply means and thereby stop the engine.

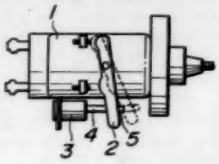
4,421,076
STARTING AUXILIARY DEVICE FOR INTERNAL COMBUSTION ENGINE

Masahiro Sasaki, Fujisawa, Japan, assignor to Nissan Motor Co., Ltd., Kanagawa, Japan

Filed May 22, 1981, Ser. No. 266,392
Claims priority, application Japan, May 23, 1980, 55-70938[U]
Int. Cl.³ F02N *17/00*
U.S. Cl. 123—179 L **7 Claims**

1. An auxiliary starting device for an internal combustion engine, said device comprising a control lever for increasing and decreasing fuel to be injected from a fuel injection pump and driving means actuated by a starting switch, said driving means including means for releasably engaging said control lever for actuating said control lever in a direction to increase an amount of fuel provided while starting said internal combus-

tion engine to at least a predetermined amount, said last mentioned means operable for permitting said control lever to



move in a direction increasing the amount of fuel beyond said predetermined amount.

4,421,077

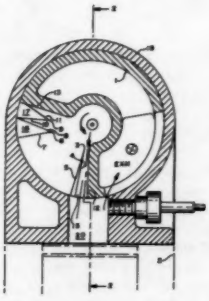
VARIABLE TIMING ROTARY VALVE FOR AN INTERNAL COMBUSTION ENGINE

John R. Ruggeri, 79 Apple Valley Rd., Stamford, Conn. 06903

Continuation-in-part of Ser. No. 38,280, May 11, 1979, Pat. No. 4,370,955, which is a continuation-in-part of Ser. No. 21,444, Mar. 19, 1979, abandoned. This application Sep. 10, 1980, Ser. No. 185,971

Int. Cl.³ F01L *7/18*

U.S. Cl. 123—190 BD **15 Claims**



1. Engine apparatus for obtaining variable intake valve timing in an internal combustion engine comprising at least one cylinder said apparatus comprising:

A. a support member having at least one port communicating with each cylinder and formed with an interior which is at least partially hollow;

B. a rotatable valve member housed within said support member said valve member having means of support for rotation about an axis, and circumferential intake porting means for uncovering said port in said support member for selectively enabling and preventing the flow of intake charge through the valve and its ducting means into the cylinder;

C. means for driving said rotatable valve member at a precise angular speed in relation to crankshaft speed; and,

D. means mounted for rotation with said rotatable valve member responsive to the difference in the pressure in said rotatable valve member and said cylinder for changing the effective length of said circumferential intake porting means in said rotatable valve said changing of effective length resulting in changing of the timing and duration of effective communication of said circumferential intake port with said support member port during which intake charge flow is permitted.

4,421,078

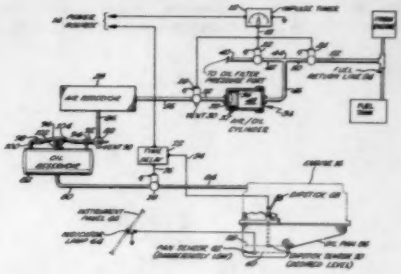
OIL CHANGING SYSTEM

Erwin E. Hurner, 413 Valley Ave., Moorhead, Minn. 56560

Continuation-in-part of Ser. No. 192,077, Dec. 29, 1980, abandoned. This application Dec. 22, 1980, Ser. No. 218,918

Int. Cl.³ F02M *1/00*

U.S. Cl. 123—196 R **11 Claims**



1. An oil changing system for automatically metering control amounts of engine lubricating oil into the diesel fuel supply of diesel engines as the engine operates, comprising:

a fuel tank remote from the engine containing diesel fuel oil;

an engine lubrication system containing a predetermined quantity of a lubricating oil different from said diesel fuel oil and including an oil pan;

control means for generating a regular, periodic signal at preset time intervals during engine operation, said time intervals corresponding to a predetermined oil change interval to provide for desired oil removal from said engine lubrication system;

fixed displacement pump means communicating with said engine lubrication system and with said fuel tank, said pump means being intermittently operable in response to said signal during engine operation for a controlled, limited duration in response to each periodic signal generated to withdraw a limited, predetermined amount of said lubricating oil from said engine lubrication system and to transport said limited amount into said fuel tank for thorough mixing of lubricating oil and fuel oil for subsequent combustion of the resultant mixture in the engine as fuel, said predetermined amount of lubricating oil withdrawn by said pump means at each signal interval and such predetermined intervals being such that said predetermined quantity of lubricating oil is withdrawn from said engine lubrication system over a predetermined lubricating oil drain time period; and

means for maintaining a predetermined oil level in said oil pan;

whereby lubricating oil removed by said pump means is replaced and the lubricating oil in said lubrication systems maintains a substantially constant acceptable contaminant level and the need for discrete periodic oil changes is eliminated.

4,421,079

DIESEL ENGINE COMBINATION FUEL VAPORIZER AND AIR/FUEL MIXER

Wallace R. Wade, Farmington Hills, Mich., assignor to Ford Motor Company, Dearborn, Mich.

PCT No. PCT/US82/01374, § 371 Date Sep. 30, 1982, § 102(e) Date Sep. 30, 1982

PCT Filed Sep. 30, 1982, Ser. No. 444,399

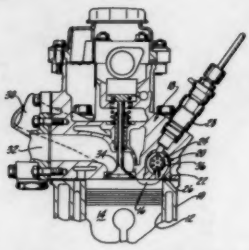
Int. Cl.³ F02B *19/08*

U.S. Cl. 123—255 **7 Claims**

1. A combination fuel vaporizer and air/fuel mixer for a compression ignition type engine having a divided combustion chamber including a main chamber contiguous to the face of

the engine piston and a second prechamber in the cylinder head facing the main chamber and connected to the main chamber by a throat type transfer passage for the transfer of air in a tangential manner into the prechamber from the main chamber during the compression stroke of the engine to create a swirling motion to the air in the prechamber, and means for spraying fuel into the prechamber, the improvement comprising,

the prechamber having a hollow member located centrally therein in the path of fuel sprayed into the prechamber to



wet a portion of the outer surface thereof, the member being spaced from the walls of the prechamber for the flow of swirl air between the prechamber and member, supplementary air transfer passage means connecting a portion of the incoming hot air from the main chamber to the interior of the member for heating the same and vaporizing fuel sprayed against the outer surface thereof, and a plurality of air transpiration holes in the wall of the member connecting the air from the interior of the member to the prechamber space surrounding the member for mixing with the fuel.

4,421,080

COMBUSTION CHAMBER FOR INTERNAL COMBUSTION ENGINE

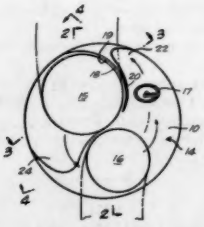
Katsushige Kogure, Higashimatsuyama; Kenzo Suzuki, Fujimi, and Masami Kamimura, Niiza, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 13, 1981, Ser. No. 283,113

Claims priority, application Japan, Jul. 26, 1980, 55-101867

Int. Cl.³ F02B *23/00*

U.S. Cl. 123—306 **1 Claim**



1. A combustion chamber construction for an internal combustion engine having a cylinder head, comprising, in combination: a ceiling wall in the cylinder head forming a combustion chamber, a suction port and an exhaust port in the cylinder head both communicating with the combustion chamber, a curved swirl guide wall partially encircling the periphery of said suction port and projecting from the ceiling wall into the combustion chamber, an opening in the ceiling wall for reception of an ignition plug, said opening being located on the opposite side of the curved swirl guide wall from said suction port, said curved swirl guide wall acting to cause fluid entering said combustion chamber from said suction port to swirl in a direction to pass the exhaust port and said opening in that sequential order, said ceiling wall having a flame guide recess extending with decreasing depth from said opening in the downstream direction of the swirl and toward said curved swirl guide wall.

4,421,081

SPARK-IGNITION INTERNAL COMBUSTION ENGINE

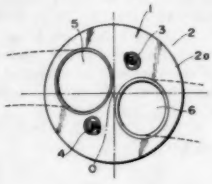
Ken Nakamura, Kawasaki; Tadashi Nagai, and Masanori Takami, both of Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Feb. 9, 1981, Ser. No. 232,858

Claims priority, application Japan, Feb. 12, 1980, 55-15855; Feb. 13, 1980, 55-16434; Feb. 14, 1980, 55-17151; Mar. 27, 1980, 55-39438; Mar. 27, 1980, 55-39439

Int. Cl.³ F02P *15/02*

U.S. Cl. 123—310 **11 Claims**



1. A spark-ignition internal combustion engine having a cylinder with a cylinder bore and an axis defining the center of said bore, comprising:

a piston reciprocally disposed in the cylinder;

a cylinder head having a wall surface closing an end of said cylinder bore and defining a combustion chamber between said wall surface and the piston;

intake and exhaust valves disposed on said wall surface and positioned generally symmetrically with respect to an extension of said center axis of the cylinder bore, said intake and exhaust valves having centers disposed in a first vertical plane which defines first and second sections of the combustion chamber on opposite sides thereof;

means defining first and second squish areas located respectively in said first and second sections of the combustion chamber, said first and second squish areas defining means including first and second projecting wall portions, respectively, which project from and are integral with said cylinder head, and which respectively have first and second sidewall portions extending generally parallel to said center axis, to define the combustion chamber;

a first spark plug having a tip disposed in said first section of the combustion chamber and located in the vicinity of said first projecting wall portion;

means defining a first recess at a surface of said first projecting wall portion in the vicinity of said first spark plug, the surface of said recess being spaced from the tip of said spark plug whereby flame propagation from the tip of said first spark plug is substantially unobstructed by the surface of said first projecting wall portion;

a second spark plug having a tip disposed in said second section of the combustion chamber and located in the vicinity of said second projecting wall portion;

means defining a second recess at a surface of said second projecting wall portion in the vicinity of said second spark plug whereby flame propagation from the tip of said second spark plug is substantially unobstructed by the surface of said second projecting wall portion;

the surfaces of said first and second recesses extending generally radially outward and generally parallel to the side-

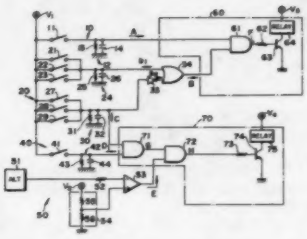
walls of said first and second projecting wall portions, respectively, and towards an end of said wall portions in a central region thereof.

4,421,082

ENGINE CONTROL APPARATUS

Shinji Katayose, Tokyo, and Masatsugu Ohwada, Yokosuka, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Aug. 16, 1982, Ser. No. 408,628
Int. Cl.³ F02D 33/00
U.S. Cl. 123—333 17 Claims



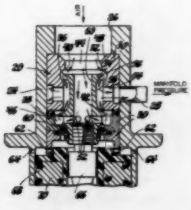
1. An apparatus for controlling an internal combustion engine of an automotive vehicle having a transmission, a clutch, a throttle valve, and sources for generating signals indicative of: (a) the throttle valve opening at an angle less than a predetermined value, (b) the transmission being in high gear or in neutral, (c) the transmission being in low gear, (d) the engine operating at a speed less than a predetermined value, and (e) the clutch being disengaged, said apparatus comprising means for terminating delivery of fuel to the engine upon the occurrence of two conditions indicated by signals (a) and (b), and means for restarting the engine upon the occurrence of three conditions indicated by signals (c), (d) and (e).

4,421,083

ENGINE AIR FLOW REGULATOR

Donald D. Stoltman, Henrietta, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed May 12, 1982, Ser. No. 377,387
Int. Cl.³ F02D 11/10
U.S. Cl. 123—339 4 Claims



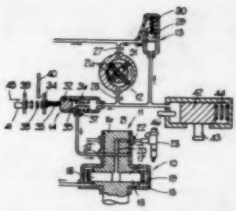
1. An air flow regulator for an engine having an air induction passage containing a throttle, said regulator comprising a valve body having a bore and a valve member disposed in said bore, said valve body having a pair of axially spaced concentric valve seats formed on said bore, said valve member having a pair of valve surfaces each associated with one of said valve seats, said valve seats and valve surfaces dividing said bore to define an inlet pressure region at one end of said bore and an intermediate pressure region at the other end of said bore, said regulator having an open inlet connection to said inlet pressure region and a restricted inlet connection to said intermediate pressure region, said inlet connections being adapted to receive air from said induction passage upstream of said throttle, said regulator having an outlet connection from said bore between said valve seats adapted to discharge air to said induction passage downstream of said throttle, whereby air may flow from said induction passage upstream of said throttle through said inlet connections and said regions, past said valve seats and through said outlet connection to said induction passage downstream of said throttle, a reference device exerting a bias on said valve member tending to increase such air flow, and a diaphragm responsive to the pressure in said intermediate pressure region and exerting a force on said valve member tending to reduce such air flow, said reference device and said diaphragm positioning said valve member to create a pressure in said intermediate pressure region which balances the force exerted by said diaphragm with the bias exerted by said reference device, whereby said valve member is positioned to provide the desired air flow past said valve seats.

4,421,084

FUEL INJECTION PUMPING APPARATUS

Brian E. Broadwith, Burnham on Crouch, and Robert T. J. Skinner, High Wycombe, both of England, assignors to Lucas Industries Limited, Birmingham, England

Filed Mar. 17, 1978, Ser. No. 887,468
Claims priority, application United Kingdom, Feb. 21, 1978, 6750/78
Int. Cl.³ F02M 59/20
U.S. Cl. 123—365 8 Claims



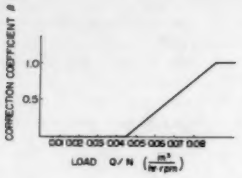
1. A fuel injection pumping apparatus for supplying fuel to a compression ignition internal combustion engine comprising an injection pump operable to deliver fuel at high pressure to injection nozzles of the associated engine, a fuel control member movable to vary the amount of fuel supplied by the injection pump, a timing control member movable to vary the timing of delivery of the fuel by the injection pump, and governor means including speed responsive means which is responsive to the speed of the associated engine, said governor means comprising a first spring having one end thereof subjected to a force exerted by said speed responsive means, an adjustable abutment engaging the other end of said first spring, a second spring, a support member, said second spring being positioned between said adjustable abutment and said support member and having a strength less than the strength of said first spring, said second spring being operative under engine idle conditions and forming with said speed responsive means an idle governor, said first spring being operative at higher engine speeds and forming with said speed responsive means a maximum speed governor, manually operable means engageable with said adjustable abutment to increase the amount of fuel supplied by the apparatus, and means operable from the exterior of the apparatus for effecting an increase in the force exerted by said second spring whereby the idling speed of the engine is increased.

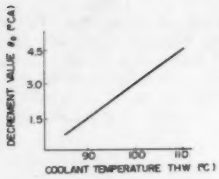
4,421,085

METHOD OF AND APPARATUS FOR CONTROLLING THE IGNITION TIMING OF AN INTERNAL COMBUSTION ENGINE

Masaomi Nagase, Toyota, and Hideo Miyagi, Okazaki, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Sep. 18, 1981, Ser. No. 303,495
Claims priority, application Japan, Sep. 25, 1980, 55-132268
Int. Cl.³ F02P 5/04
U.S. Cl. 123—416 **16 Claims**





1. A method of controlling the ignition timing of an internal combustion engine having an intake manifold, said method comprising the steps of:

generating a first electrical signal related to one of the flow rate of air sucked into the engine and the pneumatic pressure in the intake manifold;

generating a second electrical signal related to a rotational speed of said engine;

calculating, in response to said first and second electrical signals, a spark advance angle which represents an optimum ignition timing at the operating conditions corresponding to said first and second electrical signals;

generating a third electrical signal related to a temperature of said engine;

correcting, in response to said third electrical signal, said calculated spark advance angle to decrease by a decrement value which is determined depending upon the detected engine temperature, when the detected engine temperature exceeds a predetermined value which is higher than the engine temperature at the normal operating condition, said decrement value being increased when the detected engine temperature is increased; and

controlling the timing of the sparks applied to the engine depending upon said corrected spark advance angle.

4,421,086

IGNITION TIMING CONTROL SYSTEM FOR AN ENGINE

Tomoyuki Watanabe, and Takashi Shigematsu, both of Shizuoka, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

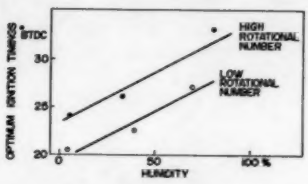
Filed Jan. 28, 1981, Ser. No. 229,264
Claims priority, application Japan, Feb. 1, 1980, 55-11636
Int. Cl.³ F02P 5/04
U.S. Cl. 123—425 **8 Claims**

1. An ignition timing control system in an internal combustion engine, comprising:

ignition timing changing means for emitting a signal to alternately advance and delay ignition timing from a reference ignition timing at a predetermined frequency in response to a periodic signal;

engine vibration detecting means for detecting vibration of said engine and emitting a vibration signal;

ignition timing determining means, responsive to said periodic signal and said vibration signal, for monitoring said vibration signal in a frequency zone substantially equa[1] to said predetermined frequency, and emitting a lag angle signal to delay the ignition timing when said periodic signal and said vibration signal have a first phase relation-



ship, and for emitting an advance angle signal when said periodic signal and said vibration signal have a second phase relationship; and

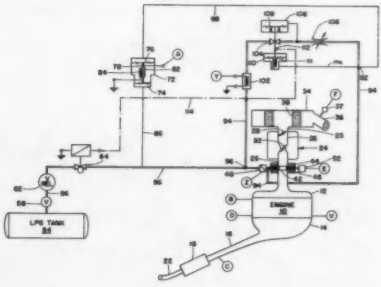
ignition timing controlling means for adjusting said reference ignition timing in response to an output of said ignition timing determining means so that said vibrations of the engine can be decreased, and controlling the ignition timing in response to an output signal from said ignition timing changing means so that the ignition timing can be changed at the predetermined frequency.

4,421,087

ALTERNATIVE LIQUID FUEL INJECTION SYSTEM AND METHOD

Eiko A. Schuurman, 70 Rechthuisdrift, Nieuwegein, Netherlands

Filed Feb. 5, 1982, Ser. No. 346,251
Int. Cl.³ F02M 7/00
U.S. Cl. 123—445 **20 Claims**



1. A fuel injection system for an internal combustion engine having an intake manifold comprising:

(a) means for supplying a gaseous fuel in a liquid state;

(b) means for receiving said fuel and injecting same in a liquid state directly into said intake manifold;

(c) means responsive to predetermined engine conditions for controlling the rate at which fuel is supplied to said manifold by said injecting means; and

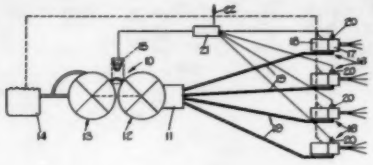
(d) means for providing vaporized fuel for starting and idling conditions comprising bypass means for withdrawing up to 10% by volume of said fuel prior to injection, vaporizing the bypassed fuel and delivering same to said intake manifold, bypassing said injecting means.

4,421,088

FUEL SYSTEM FOR COMPRESSION IGNITION ENGINE

Alec H. Seilly, North Wembley, England, Assignor to Lucas Industries Limited, Birmingham, England

Filed Jun. 23, 1981, Ser. No. 276,463
Claims priority, application United Kingdom, Jul. 3, 1980, 8021836
Int. Cl.³ F02M 51/00
U.S. Cl. 123—447 10 Claims



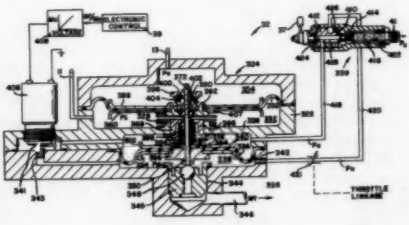
1. A fuel system for supplying fuel to a compression ignition engine comprising a plurality of electromagnetically controlled fuel injection nozzles, an accumulator in which in use, fuel is stored under pressure, electrical circuit means for effecting operation of said nozzles in timed relationship with the associated engine, transducer means for providing a signal representative of the fuel pressure in said accumulator, the signal provided by said transducer means being supplied to the electrical circuit means, said signal providing an indication of the fall in pressure of the fuel within said accumulator as a result of fuel flow through the nozzle, said fall in pressure being related to the quantity of fuel supplied through the nozzle and means for delaying the recharging of the accumulator with fuel under pressure.

4,421,089

FUEL METERING APPARATUS

Robert G. Moore, Jr., South Bend, Ind., assignor to The Bendix Corporation, Southfield, Mich.

Filed Jul. 19, 1982, Ser. No. 399,515
Int. Cl.³ F02D 1/04; F02M 39/00
U.S. Cl. 123—454 10 Claims



1. A fuel control apparatus for a combustion engine having an intake manifold comprising:

means for generating a first force proportional to the mass air flow ingested into the engine;

means for generating a second foce proportional to a differential fuel pressure, wherein said differential fuel pressure is the difference between an input fuel pressure and an output fuel pressure and wherein said output fuel pressure is developed from said input fuel pressure by restricting the input fuel pressure across two parallel orifices;

a metering valve positioned in response to said first and second forces for metering fuel to said engine at said output pressure;

means for controlling the effective cross-sectional area of one of said restrictions in response to an electrical signal indicative of a desired fuel/air ratio for the engine; and

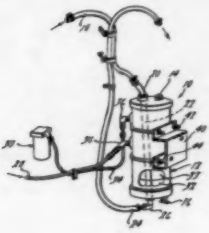
means for generating said electrical signal from at least one operating parameter of the engine indicative of the actual fuel/air ratio of the engine.

4,421,090

FUEL PROCESSOR APPARATUS FOR DIESEL ENGINE POWERED VEHICLES

Leland L. Davis, Saline, Mich., assignor to Davco, Inc., Ann Arbor, Mich.

Continuation of Ser. No. 188,875, Sep. 19, 1980, Pat. No. 4,368,716. This application Oct. 21, 1982, Ser. No. 435,681
The portion of the term of this patent subsequent to Jan. 18, 2000, has been disclaimed.
Int. Cl.³ F02M 31/00; B01D 23/00
U.S. Cl. 123—557 2 Claims



1. A fuel processor means for use with diesel engines on diesel trucks, automobiles, and the like, and whereby said fuel processor means is operative to preheat the diesel fuel and to separate out water-impurities from the diesel fuel, comprising,

a vertically oriented tubular vessel means operative for separating water out of the fuel,

inlet conduit means to introduce hot liquid from the engine,

another conduit means passing through a central portion of said vessel for transmitting the hot liquid therethrough,

outlet conduit means for recirculating the hot liquid back through the engine system,

a second inlet conduit means for introducing fuel to the interior of the vessel near the midpoint thereof for flow therethrough and such that this inlet is above the level of water-impurities being collected in the vessel,

a second outlet conduit means for the fuel near the top of the vessel for transmitting the water-free fuel to the engine,

drain means at the bottom of the vessel for draining out water-impurities which collect therein, and

vent means near the top of the vessel for venting the vessel when desired.

4,421,091

IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES

Hisasi Kawai, Toyohashi; Hiroshi Sada, Okazaki; Toshihiko Igashira, Toyokawa, and Toru Yoshinaga, Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Mar. 25, 1982, Ser. No. 361,614
Claims priority, application Japan, Mar. 31, 1981, 56-49160
Int. Cl.³ F02P 1/00
U.S. Cl. 123—620 4 Claims

1. An ignition system for an internal combustion engine comprising:

ignition coil means having a primary and secondary winding;

means for supplying a primary current to energize said primary winding whereby a high voltage for producing a spark is induced in said secondary winding when said primary current is interrupted;

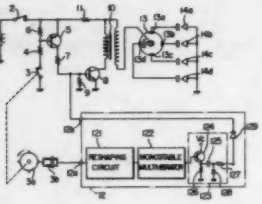
ignition signal generating means for generating a first ignition signal in synchronism with the rotation of said engine

to determine the times of switching on and off said primary current;

switching means with a control input terminal responsive to said first ignition signal from said ignition signal generating means for switching on and off said primary current;

TDC signal generating means for detecting, substantially the top dead center of each of cylinders of said engine to generate a TDC signal; and

a control circuit for generating a second ignition signal



having a sawtooth waveform, said second ignition signal attaining a predetermined potential at the moment said TDC signal is applied and then decreasing gradually with the lapse of time, said control circuit having an output terminal connected to said control input terminal of said switching means;

whereby said switching means turned off in response to said first ignition signal is turned on again upon occurrence of said TDC signal and then turned off gradually in accordance with said sawtooth signal.

4,421,092

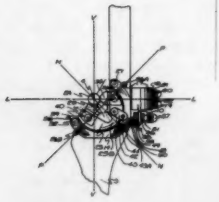
ARCHERY ARROW SUPPORT DEVICE

Sherrell G. Christian, Rte. 1, Box 72-L, Tickfaw, La. 70466

Filed Aug. 24, 1981, Ser. No. 295,383

Int. Cl.³ F41B *5/00*

U.S. Cl. 124—41 A **2 Claims**



1. An arrow support assembly for counteracting the vertical and horizontal forces imposed on an arrow being shot from an archery bow, said assembly being adapted for mounting on the handle section of an archery bow having a longitudinal axis extending perpendicularly to the horizontal plane containing the longitudinal axis of intended arrow flight and having a cut-out sight window through which arrows are to be shot, said assembly comprising, in combination, the following:

a. pivot frame means for rigidly connecting to said handle section of said archery bow,

b. yoke member means pivotally connected to said pivot frame means, all of said yoke member means pivoting in response to the forces imposed on an arrow being shot from a bow, said yoke member means having connected thereto, and extending in the direction of intended arrow flight, at least two, spaced apart, elongated, substantially non-resilient means for engaging and supporting an arrow along a substantial length of an arrow, and

c. resilient means for biasing in unison said yoke member means and said means for supporting an arrow toward a predetermined neutral position as an arrow is being shot from an archery bow to counteract the vertical and horizontal forces imposed on said arrow as said arrow is being shot from said archery bow.

4,421,093

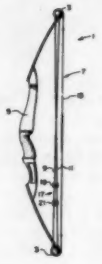
DRAW STOP MECHANISM FOR A COMPOUND ARCHERY BOW

Carl R. Stock, Bridgeton, Mo., assignor to ACCRA Manufacturing Co., Broken Arrow, Okla.

Filed May 27, 1982, Ser. No. 382,601

Int. Cl.³ F41B *5/00*

U.S. Cl. 124—86 **10 Claims**



1. A compound archery bow comprising:

a bow member having two ends,

at least one pulley wheel and means for mounting said pulley wheel adjacent one end of said bow member,

bow string and means for mounting said bow string to make at least three passes between the ends of said bow member with respective portions of said first and second passes extending adjacent one another between the two ends of said bow member and moving in opposite directions as said third pass is drawn, and

draw stop, said draw stop including first and second stop members, means on said first stop member for fixedly securing said first stop member to said first pass at a first predetermined location along said associated portion thereof between said bow member ends, and means on said second stop member for fixedly securing said second stop member to said second pass at a second predetermined location said associated portion thereof between said bow member ends whereby said first and second stop members are moved toward one another as said third pass of said bow string is drawn and abut one another at a predetermined draw position of said bow string.

4,421,094

PARABOLIC SHAPED HEATER

Roscoe K. Crane, Rte 12, Box 764–A Fayetteville, N.C. 28306 and Alton B. King, Hope Mills, 3547 Antilles Clr. N.C. 28306

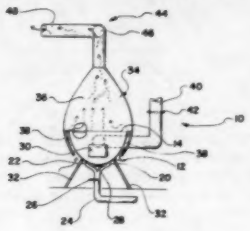
Filed Apr. 11, 1980, Ser. No. 139,571

Int. Cl.³ F24C *1/14*

U.S. Cl. 126—61 **7 Claims**

1. A heater comprising: a generally closed arcuately shaped lower wall structure having a bottom area and generally upwardly projecting sides; support means associated with said lower wall structure for supporting the same; a burning area defined interiorly within said lower wall structure in such a manner that radiant heat resulting from material burned therein is reflected upwardly by the interior of said arcuately shaped lower wall structure; a generally horizontal heat collector panel exending across the upwardly projecting sides of said lower wall structure for collecting radiant heat reflected by the interior of said arcuately shaped lower wall structure; flue means communicatively connected with the burning area

defined between said lower wall structure and said collector panel for enabling smoke and other exhaust gases resulting from material burned therein to be expelled from said heater; hood means extending downwardly around a portion of said lower generally closed arcuately shaped wall structure and projecting upwardly pass said collector panel, said hood means being spaced outwardly from said lower wall structure so as to define an air induction space between said hood means and the generally closed arcuately shaped lower wall structure for enabling air to move upwardly into and through said air induction space between said hood means and said lower wall structure and about said collector panel where heat is transferred to the passing air from said heater, said generally arcuately shaped lower wall structure being provided in the form of a parabola having a foci area within said burning area, and



wherein said burning area is provided with burning material support means for supporting material being burned in the foci area such that combustion generally occurs about the foci area of said parabola and thus the resulting radiant energy is directed outwardly against the interior walls of said parabola type lower wall structure where the radiant energy is reflected back upwardly to said horizontal collector panel; and wherein said hood means assumes a suspended position over said lower parabolic shaped wall structure and extends downwardly pass said collector panel where a lower portion of said hood means generally encompasses the collector panel and an upper portion of said parabolic shaped lower wall structure; and wherein said hood means is spaced outwardly from said parabolic shaped wall structure such that air may be induced generally upwardly therebetween and over said collector panel before efficiently transferring heat from said heater to the passing air.

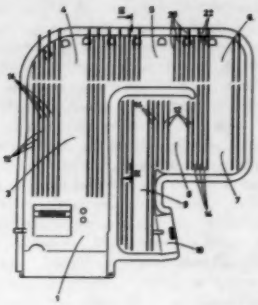
4,421,095

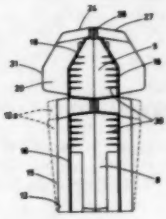
ROOM HEATING APPARATUS FOR SMALL SPACES

Philipp Kreis, Munich, Fed. Rep. of Germany, assignor to Philipp Kreis GmbH & Co., Munich, Fed. Rep. of Germany

Filed Sep. 28, 1981, Ser. No. 305,983
Int. Cl.³ F24C *3/00*; F28F *1/20*
U.S. Cl. 126—91 R **7 Claims**

1. In a room heating apparatus for small spaces adapted to be fired with a gaseous or vaporized liquid fuel, such as in mobile homes, and having a combustion space, a combustion gas channel connected thereto serving as a heat exchanger provided with an upper horizontal cross channel having vertical walls, and outer fins vertically arranged on the sidewalls of said combustion gas channel, the improvement comprising said outer fins of the cross channel being formed at least in the region of its greatest heating as large surface fins, having outer edges which have a greater distance from the respective vertical walls of the cross channel than the distance of outer edges of the outer fins provided thereunder from their respective channel walls, and each of said large surface fins extending for





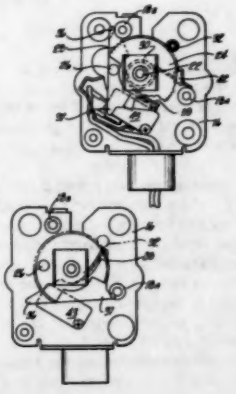
substantially the full height of the respective vertical walls of the cross channel.

4,421,096

VENT DAMPER DRIVE

Thomas J. Butzen, 3448 Colony Dr., Greenfield, Wis. 53221

Continuation of Ser. No. 253,124, Apr. 10, 1981, abandoned, which is a continuation of Ser. No. 93,479, Nov. 13, 1979, Pat. No. 4,262,652. This application Oct. 21, 1982, Ser. No. 435,781
Int. Cl.³ F23L *3/00*
U.S. Cl. 126—285 B **4 Claims**



1. A drive system for a damper which is supported in a housing for motion between first and second positions, comprising: a shaft attached to the damper so that axial rotation of the shaft moves the damper between said first and second

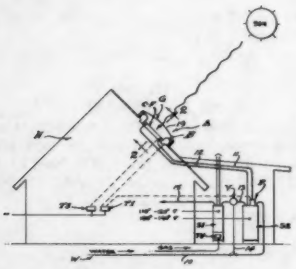
positions; a pair of stops fixed with respect to the housing; stop means connected to the shaft for engaging said first and second stop means at extreme positions of motion of the damper to limit motion of the damper between said first and second positions; bias means fixed between the housing and the shaft adapted to urge motion of the damper toward said first position; a uni-directional drive motor having an output and being adapted when energized to overcome said bias means and move said damper toward said second position; and means connecting the output of the drive motor to the shaft, said connecting means including means for allowing limited rotation of the drive motor under the force of inertia after the damper has reached the end of its travel toward the first position under the force of the bias means, said means for allowing limited rotation including a gear member drivingly coupled with said drive motor and mounted for rotation on said shaft, said gear member including a cutout therein, said connecting means further including a drive member mounted on said shaft for rotation therewith, said stop means being carried on said drive member, said drive member including a projection extending through said cutout in said gear member and adapted to drivingly engage said gear member at opposite extremities of said cutout.

4,421,097

SOLAR LIGHTING SPACE AND WATER HEATING SYSTEM

Milton Meckler, 16348 Tupper St., Sepulveda, Calif. 91348

Filed Sep. 16, 1981, Ser. No. 302,801
Int. Cl.³ F24J *3/02*; E06B *1/38*
U.S. Cl. 126—422 **21 Claims**



1. A solar lighting and insolation system for room-chamber daylighting and space heating, and including;

a window-skylight opening exposed to the traverse plane of the sun between horizons and through a transparent cover forming the outer wall of a plenum chamber to contain heated air,

a solar absorber occupying said opening and comprised of a heat transfer coil for transporting fluid media and having closely related fins forming the inner wall of said plenum chamber and vertically and fixedly disposed in spaced parallel planes angularly related to said traverse plane for high absorbtivity and low emissivity and forming a labyrinth for diffused daylighting within said room-chamber,

means transporting the fluid media through the coil for heat transfer at the finned labyrinth,

a recirculating means transporting the heated air through said plenum and finned absorber coil and through said room-chamber,

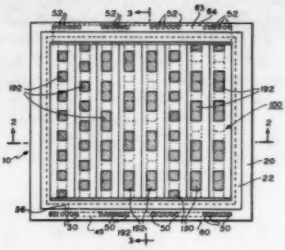
and a temperature responsive means operating the recirculating means when insolate heated air is available through the said plenum and finned absorber coil at a higher temperature than the air in the room-chamber.

4,421,098

MULTIFUNCTION SOLAR WINDOW AND VENETIAN BLIND

Frank Meta, 147 Haper Ave., Irvington, N.J. 07111

Filed Jun. 15, 1981, Ser. No. 273,635
Int. Cl.³ F24J *3/02*
U.S. Cl. 126—429 **7 Claims**



1. A double glazed solar window for use in an exterior wall of a dwelling for selectively heating, insulating and ventilating the interior of said dwelling, said window having two parallel panes of glass separated by a predetermined distance, said parallel panes partially enclosing an intermediate space, comprising:

a quadrangular frame for peripherally holding said panes of glass in a vertical orientation, said frame having:

a. a predetermined depth, height, width and thickness, said height and width dimensions lying in a plane parallel to said wall:

b. an interior peripheral surface facing the interior of said dwelling and an exterior peripheral surface facing the exterior of said dwelling, said interior and exterior surfaces each parallel to said plane and spaced apart by said predetermined depth;

c. an external lateral peripheral surface perpendicular to said plane, said external lateral surface having said predetermined depth, height and width, said external lateral surface extending peripherally about said frame;

d. an internal lateral surface parallel to said external lateral surface, said internal surface situated symmetrically within said external lateral surface and spaced apart therefrom by said predetermined thickness, said internal surface cooperating with said parallel panes to enclose said intermediate space;

e. a plurality of first channels adjacent the bottom of said frame and communicating between said interior of said dwelling and said exterior of said dwelling;

f. a plurality of second channels adjacent the top of said frame and communicating between said interior of said dwelling and said exterior of said dwelling;

g. a plurality of third channels communicating said intermediate space with said first channels;

h. a plurality of fourth channels communicating said immediate space with said second channels;

a first valve means disposed within said plurality of said first channels for selectively communicating said corresponding third channel to said interior or exterior of said dwelling;

a second valve means disposed within said plurality of said second channels for selectively communicating said corresponding fourth channel to said interior or exterior of said dwelling;

a plurality of rectangular slats oriented in parallel between said panes, each slat extending from one linear side of said internal surface to the opposite linear side of said internal surface, each of said slats having on side thereof predisposed to absorb solar thermal energy wherein each of said slats is provided with a predetermined number of trans-

verse slits therein, each slit of a first predetermined length and width; a plurality of longitudinally extended rectangular strips for being interwoven between said slits in said slats in a predetermined manner to provide for a plurality of decorative patterns, each of said strips having a second predetermined length and width and a predetermined length and width and a predetermined thickness; and

framework means for holding said slats and for enabling each of said slats to be rotated generally about their respective axes for selectively substantially facing said one side of said slats toward said interior of said dwelling or toward said exterior of said dwelling.

4,421,099

SOLAR COLLECTOR

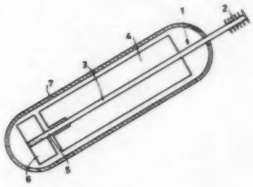
Herman H. M. van der Aa, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 12, 1981, Ser. No. 320,364

Claims priority, application Netherlands, Dec. 11, 1980, 8006717

Int. Cl.³ F24J *3/02*

U.S. Cl. 126—433 **7 Claims**



1. A solar collector, which comprises a heat pipe having an evaporator section and a condenser section; a solar heat absorber plate thermally conductively connected to the evaporator section, one side of said absorber plate being provided with a layer for the selective absorption of incident solar heat; and an evacuated transparent envelope enclosing the absorber plate and the evaporator section, a part of the evaporator section being free of the absorber plate and being provided with a separate layer for the selective absorption of incident solar heat, said separate layer having the same heat absorption coefficient as but a higher heat emission coefficient than the layer on the absorber plate per unit of length of the evaporator section.

4,421,100

THERMOSYPHON HEAT PIPE HOT WATER APPLIANCE

Ying-Nien Yu, Marina del Rey, Calif., assignor to Ying Mfg. Corp., Gardena, Calif.

Filed Dec. 20, 1983, Ser. No. 333,424

Int. Cl.³ F24J *3/02*

U.S. Cl. 126—435 **10 Claims**

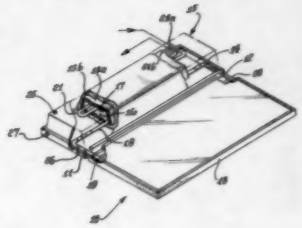
1. In a fluid heater assembly, the combination comprising

(a) a solar collector having an inlet for a first fluid to be heated, and an outlet for the solar heated fluid,

(b) a metallic tank for containing heat transfer second fluid,

(c) first ducting in the tank in communication with said collector outlet to receive said heated first fluid and to transfer heat therefrom to the second fluid in the tank,

(d) and second ducting in the tank for passing third fluid into and out of the tank, and to transfer heat from the second fluid in the tank to third fluid in the second ducting,



(e) and including metallic structure via which heat is conducted from said first ducting to said second ducting, said first and second ducting includes generally longitudinally extending stretches in the tank contacted by said metallic structure which extends generally laterally in said second fluid,

(f) said metallic structure comprising webbing contacting said first and second ducting and said tank,

(g) said first and second ducting extending through said webbing the periphery of which is in heat transfer proximity to the tank wall extending about the ducting.

4,421,101

THERMAL ENERGY STORAGE SYSTEM

James D. Stice, Manchester, N.H., assignor to Kalwall Corporation, Manchester, N.H.

Filed Oct. 30, 1979, Ser. No. 89,451

Int. Cl.³ F24J *3/02*; F28D *13/00*

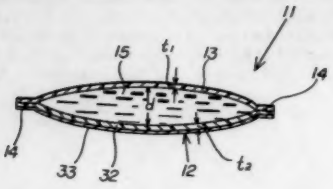
U.S. Cl. 126—436 **37 Claims**

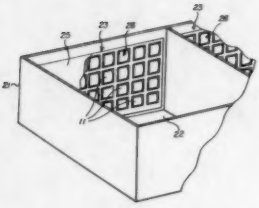
1 A thermal energy storage unit comprising:

a sealed container comprising a front wall portion and a rear wall portion, said front and rear wall portions together being partially absorptive and partially transmissive of visible light with a transmittance of between 4% and 85% and an absorptance of at least 9%; and

a thermal energy storage substance retained by said container between said front and rear wall portions, said

energy storage substance being at least partially transmissive of visible light and experiencing a liquid-solid phase change at a predetermined temperature condition between 45° F. and 190° F.





4,421,102

PROCESS AND APPARATUS FOR HEATING A TRANSPARENT, GASEOUS MEDIUM BY MEANS OF CONCENTRATED SOLAR RADIATION

Mario Posnansky, Melchenbühlweg 18, 3006 Bern (Canton of Berne), and Ruedi Kriesi, Mühlebühl 1, 9100 Herisau (Canton of Appenzell), both of Switzerland

PCT No. PCT/CH79/00064, § 371 Date Jan. 2, 1980, § 102(e) Date Dec. 27, 1979, PCT Pub. No. WO79/01021, PCT Pub. Date Nov. 29, 1979

PCT Filed May 2, 1979, Ser. No. 192,521

Claims priority, application Switzerland, May 2, 1978, 4772/78

Int. Cl.³ F24J *3/02*

U.S. Cl. 126—438 **18 Claims**

1. Apparatus for heating a transparent, gaseous medium by means of highly concentrated solar radiation, with first means for supplying the gaseous medium to a number of pipes which are exposed to the concentrated solar radiation, and second means for exhausting the heated gaseous medium, characterized in that the said pipes are quartz glass pipes connecting the first and second means, that a number of partially transparent bodies are disposed within each quartz glass pipe, and that spacing elements for holding the adjacent bodies are flowed around by the gaseous medium.

4,421,103

Patent Not Issued For This Number

4,421,104

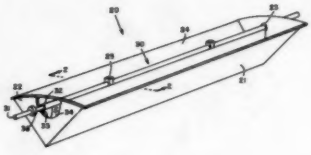
CONCENTRATING/TRACKING SOLAR ENERGY COLLECTOR

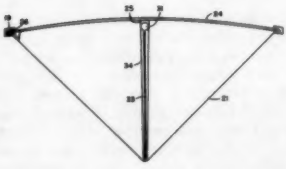
Thomas P. Adcock, 300 Meadowbrook Dr., Huntsville, Ala. 35803

Filed Jan. 11, 1982, Ser. No. 338,694

Int. Cl.³ F24J *3/02*

U.S. Cl. 126—438 **7 Claims**





1. A concentrating, tracking solar energy collector comprising:

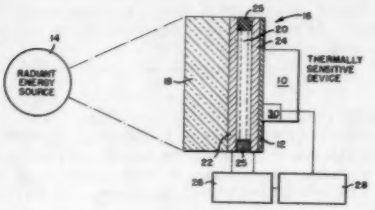
a. A solar reflector assembly including a V-shaped trough having a reflective inner surface and a trough cover lens mounted above said trough; and,

b. A solar absorber assembly including a heat exchange tube mounted inside said solar reflector assembly and extending along the length thereof, said solar absorber assembly further including an absorber plate rotatably mounted on said heat exchange tube and extending into said trough along the length thereof, said heat exchange tube and said absorber plate having a coating of silicone heat conducting lubricant disposed therebetween to provide for heat conduction from said absorber plate to said heat exchange tube while permitting relative rotation therebetween, and, a heat exchange cover lens mounted in spaced relation over said absorber plate.

4,421,105
THERMAL CONTROL METHOD

Calvin L. Wilkinson, Renton, and Christopher G. Shaw, Redmond, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Jun. 10, 1981, Ser. No. 272,401
Int. Cl.³ F23J 3/02
U.S. Cl. 126—452 2 Claims



1. A method for controlling the temperature of a radiant energy absorbing body exposed to radiant energy utilizing an assembly means containing a liquid-crystal-based material, said material being capable of having a cholesteric-nematic phase transition with pleochroic dyes, said method comprising:

disposing said assembly means in contact with said body,

sensing the temperature of said body,

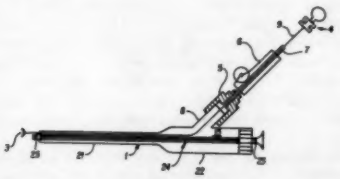
imposing an electric field upon said liquid-crystal-based material in response to an increase in the temperature of said body to force said liquid-crystal-based material into a nematic phase whereby the absorption of radiant energy by said body may be minimized,

removing said electric field in response to a decrease in the temperature of said body to allow said liquid-crystal-based material to relax into a cholesteric phase whereby the absorption of radiant energy by said body may be maximized.

4,421,106
FIBER SCOPE FOR BIOPSY OPERABLE BY A SINGLE OPERATOR

Takami Uehara, 1126, Hojo-1-chome, Daito-shi, Japan

Continuation of Ser. No. 77,125, Sep. 19, 1979, abandoned, which is a continuation of Ser. No. 778,961, Mar. 18, 1977, abandoned. This application Jul. 8, 1981, Ser. No. 281,413
Claims priority, application Japan, Mar. 19, 1976, 51-30670
Int. Cl.³ A61B 1/00
U.S. Cl. 128—4 3 Claims



1. A fiberoptic endoscope comprising:

a control unit housing;

a branched conduit in said housing having a first proximal end, a second proximal end and a distal end, said first proximal end having an inlet opening;

a flexible hollow conduit attached to said housing having a proximal end and a distal end, the proximal end being fixed in said housing at the distal end of said branched conduit and extending from said distal end of said branched conduit;

an optic assembly comprising an eyepiece assembly mounted in said housing at said second proximal end, a bundle of flexible optical fibers extending in said branched conduit and said hollow conduit from said eyepiece assembly to said distal end of said hollow conduit, and an objective assembly mounted on said distal end of said hollow conduit optically connected through said bundle of optical fibers to said eyepiece assembly;

a guide sleeve formed as a portion of said housing at said inlet opening of said first proximal end of said branched conduit;

a flexible tube operatively aligned with said guide sleeve and said inlet opening;

a flexible forceps control wire extendable and retractable through said flexible tube, said guide sleeve, said inlet opening, said hollow conduit to and beyond the distal end and from the entirety thereof;

a forceps attached to said flexible forceps control wire at an end of said wire extending beyond the distal end of said hollow conduit, said forceps being at all times during observation and tissue taking in controllable view of said optic assembly;

a forceps control means attached to said forceps control wire at the other end of said wire extending out of said flexible tube; and

an adaptor holding said flexible tube to said guide sleeve and defining a narrow path with said flexible tube from said inlet opening extending outwardly in the direction of said forceps control means for slidably guiding said forceps control wire in combination with said flexible tube, said adaptor providing said narrow path for a length sufficient to positively support said flexible tube and the flexible tube being of sufficient length to positively direct the sliding motion of said forceps control wire, said flexible tube being connected to said adaptor, said forceps control wire being of such a length that the portion of wire between said adaptor and said forceps control means can, at all times, be maintained in longitudinal extension without flexion during progressive and recessive motion to and from a target spot of tissue, and an entire biopsy operation including a final operation of taking a tissue sample can be performed by a single operator by controlling said forceps control means in one hand and holding said control unit housing in said operator's other hand.

4,421,107
SURGICAL RETRACTOR ELEMENTS AND ASSEMBLY

Roger Q. Estes, and Jeffery S. B. Estes, both of W. 700 7th Ave., Spokane, Wash. 99204

Filed Oct. 15, 1980, Ser. No. 197,149
Int. Cl.³ A61B 17/02
U.S. Cl. 128—20 41 Claims

1. A surgical retractor assembly for holding a surgical incision open with body tissues held clear of a desired internal surgical area, comprising:

a retractor frame;

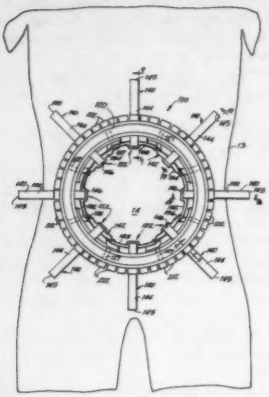
at least one resilient retractor paddle on the retractor frame adapted to extend from the frame into the incision;

said paddle including a paddle body having a front face adapted to engage the body tissues along the incision and an opposed back face adapted to face the desired surgical area;

said front and back faces extending laterally outward and downward from the frame to side and bottom edges; and

wherein said paddle body is formed of a single soft non-metallic scissile material of sufficient resiliency with a flexural modulus of elasticity of between 1,000 psi and 75,000 psi throughout the cross section of the paddle body to allow the front face thereof to progressively bend resiliently from an original undeflected orientation into an arc transversely between the side edges in response to opposing forces applied to the paddle body as the retractor assembly is moved to open the incision, to thereby distribute applied forces over surfaces of the front face to minimize

stress concentrations between the said paddle body and body tissues engaged thereby and to allow the body to



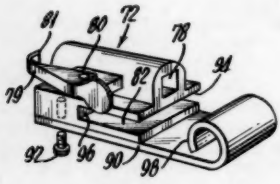
return to its original orientation as the opposing forces are released as the front face of the paddle body is disengaged from the body tissues.

4,421,108

SURGICAL RETRACTOR HOLDER

Rene J. Cabrera, Brockton; George W. Guay, North Scituate, both of Mass., and John R. Bookwalter, Brattleboro, Vt., assignors to Codman & Shurtleff, Inc., Randolph, Mass.

Filed Jul. 27, 1981, Ser. No. 286,908
Int. Cl.³ A61B *17/02*
U.S. Cl. 128—20 **2 Claims**



1. In a surgical retractor blade holder having a quick-release pawl attachment mechanism for attaching a retractor blade to a supporting structure, said retractor blade having a retractor blade handle having ratchet teeth disposed along at least one surface thereof, said quick-release pawl attachment mechanism having:

a body section having a bottom surface a bore through said body section for receiving said retractor blade handle, said bore having an interior surface;

a pawl pivotably mounted to said body section, said pawl having a leading edge for engaging cooperating ratchet teeth on said retractor blade handle; and

an open slot in said body section for engaging a supporting structure, said slot having an inside surface and a top and a bottom surface, none of said slot surfaces being in common with said bore surfaces;

the improvement comprising:

a spring detent attached to said body section bottom surface, aligned with said slot in said body section and extending beyond the end of said bottom surface;

the free end of said spring detent including a raised portion and providing a confronting surface aligned with said open slot, the top of said raised portion extending above the top surface of said slot but not obstructing access of a blade retractor handle to said bore through said body section;

the confronting surface of said raised portion spaced apart from the inside surface of said slot a distance greater than the width of said supporting structure;

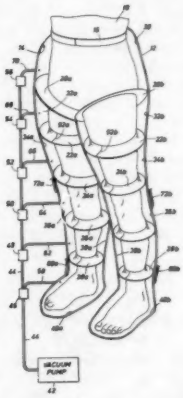
whereby said retractor blade holder may be placed on said supporting structure by displacing said spring detent and sliding said slot onto said supporting structure until said spring detent springs back into position on the opposite side of the supporting structure to loosely hold said holder on said supporting structure even when said retractor is in the relaxed position.

4,421,109

METHOD AND APPARATUS FOR SIMULATING GRAVITATIONAL FORCES ON A LIVING ORGANISM

William E. Thornton, Friendswood, Tex., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Sep. 2, 1982, Ser. No. 414,106
Int. Cl.³ A61H *7/00*
U.S. Cl. 128—25 R **17 Claims**



1. Apparatus for simulating aspects of gravitational forces on at least a portion of a living organism comprising:

casing means defining a chamber adapted to contain a portion of the body of said organism, said casing means being rigidified to resist collapse upon application of negative pressure to the interior of said chamber;

seal means extending inwardly from said casing means for effective engagement with said body portion and, in cooperation with said body portion, subdividing said chamber into a plurality of compartments each in negative pressure communicating relation with an adjacent part of said body portion;

and control means for applying negative pressures to said compartments and for maintaining said negative pressures at incrementally different levels in respective ones of said compartments.

4,421,110

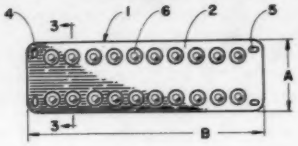
MASSAGE AND EXERCISE MAT

Richard W. DeLisle, 90 Washington St., Leominster, Mass. 01453, and Conrad Leblanc, Leominster, Mass., assignors to Richard W. DeLisle, Leominster, Mass.

Filed Jun. 2, 1981, Ser. No. 269,685
Int. Cl.³ A61H *7/00*
U.S. Cl. 128—60 **2 Claims**

1. A one piece massage and exercise mat adapted for use by

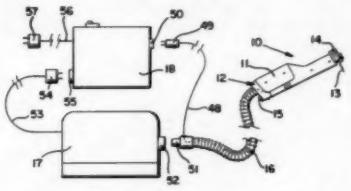
a human being to simultaneously exercise without assistance, the muscles and nerves positioned along and exiting the spinal column of said user, consisting essentially of an elongate base adapted to extend substantially from a users shoulders to his waist and two opposed rows of massage elements made of a resilient moldable material having a Shore A hardness of from about 45 to about 85, said massage elements projecting upwardly from said base and integral therewith, said massage elements transversely positioned on said base to proximately bracket the spinal column of said user and adapted to be juxta positioned by the user, longitudinally along the spinal column of said user, said massage elements being longitudinally spaced to proximately bracket the vertebrae of the spinal column of said user and adapted to be positioned by said user proximately between said vertebrae.



4,421,111
LOW-VOLTAGE SURGICAL CAST CUTTER WITH VACUUM EXHAUST OF DEBRIS

Neil S. Rothman, Baltimore, Md., assignor to Black & Decker Inc., Newark, Del.

Filed Mar. 2, 1982, Ser. No. 353,917
Int. Cl.³ A61F *5/04*
U.S. Cl. 128—91 A **9 Claims**

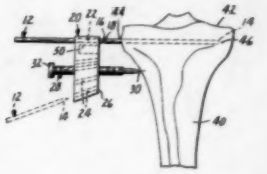


1. A surgical cast cutter, comprising a generally longitudinal tool section and a complementary hose section releasably secured to the tool section rearwardly thereof, first rib means formed transversely on the rearward portion of the tool section, second rib means formed transversely on the forward portion of the hose section and cooperating with the first rib means to slidably guide the sections into engagement with each other, the sections have respective housing edges inclined with respect to the first and second rib means, the housing edges substantially abutting one another when the sections are fully joined together, releasable latching means for retaining the sections together, electrical contact means carried by each of the sections and respectively engaging each other when the sections are joined together, the tool section having a housing with an electric motor therein, first conductor means connecting the motor to the respective contacts on the tool section, second conductor means connecting the respective contacts on the hose section to a source of power, an oscillating cutter mounted forwardly of the housing, a driving transmission means between the motor and the cutter, switch means for selectively energizing the motor, the housing having a debris conduit formed therein, the conduit commencing near the cutter and terminating in rearward opening in the tool section housing, the hose section having a forward opening formed therein and communicating with the rearward opening in the housing when the sections are joined together, means for substantially sealing the sections against air leakage therebetween adjacent to the communicating openings, and a vacuum hose carried by the hose portion, communicating with the opening therein, and extending rearwardly therefrom.

4,421,112
TIBIAL OSTEOTOMY GUIDE ASSEMBLY AND METHOD

Douglas B. Mains, Wheaton, Ill., and Kenneth E. Merte, Stillwater, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 20, 1982, Ser. No. 380,412
Int. Cl.³ A61F *5/04*; A61B *17/18*
U.S. Cl. 128—92 EB **11 Claims**



1. An osteotomy guide assembly comprising: four guide pins, each having a cutting end surface adapted to cut bone tissue upon rotation of said guide pin about its axis with said cutting end surface pressed against said tissue, at least two of said guide pins having a locating mark a first predetermined distance from said cutting end surface;

a guide block having a first pair of spaced parallel guide bores adapted to closely receive the two of said guide pins having said locating marks, and a second pair of spaced parallel guide bores adapted to receive the other two of said guide pins, said second pair of parallel guide bores converging with respect to said first pair and being oriented to direct the guide pins extending through the second bores so that a second plane tangent to and defined by the surfaces of the second pair of pins adjacent the first pair of pins will intersect a first plane tangent to and defined by the surfaces of the first pair of pins adjacent the second pair of pins at a predetermined angle and at a second predetermined distance from a locating surface on said guide block; said second predetermined distance having a known relationship to said first predetermined distance; and

means mounted on said guide block for fixing the position of said guide block along said first pair of pins against movement toward a surface positioned on the side of said block toward which said bores converge.

4,421,113
METHOD AND APPARATUS FOR CONTROLLING LUNG VENTILATORS

Andras Gedeon, Täby; Ulf Lundell, Grödinge, and Göran Pilenvik, Stockholm, all of Sweden, assignors to Engström Medical Aktiebolag, Bromma, Sweden

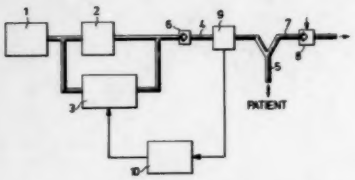
Filed Jun. 2, 1981, Ser. No. 269,782
Claims priority, application Sweden, Jun. 18, 1980, 8004530
Int. Cl.³ A61M *16/00*
U.S. Cl. 128—204.23 **9 Claims**

5. A device for controlling the operation of a lung ventilator including a breathing-gas source having means capable of delivering a volume of breathing gas per unit of time, which is at least equal to the maximum volume that may be required for the ventilation of the patient, an inspiratory line having means for connecting the same to the airways of a patient and through which the patient can breathe spontaneously from said breathing-gas source, a ventilator unit connected to said breathing-gas source and activatably by an activation signal to deliver to the patient through said inspiratory line a mandatory breath of

a predetermined tidal volume from said breathing-gas source, and an expiratory line having means for connecting the same to the airways of the patient and through which the patient can exhale, said device comprising

a flow meter for sensing continuously the flow rate of breathing gas through said inspiratory line and generating a signal proportional to the momentary value of said flow rate,

means for producing a reference signal substantially proportional to the minimum volume per unit of time, the so called minute volume, of breathing gas which the patient shall receive, said minimum volume per unit of time being less than the volume that the breathing gas source is capable of delivering,



means for calculating continuously the total integral, during the entire inhalation and exhalation cycles of ventilation of the patient, of the difference between said reference signal and said flow rate signal and for producing a signal proportional to this integral,

means for providing a first threshold signal having a value substantially proportional to said predetermined tidal volume of a mandatory breath, and

means for comparing the value of said signal proportional to said integral and said first threshold signal and generating an activation signal for activating said ventilator unit to deliver a mandatory breath to the patient each time the value of said signal proportional to said integral reaches the value of said first threshold signal.

4,421,114

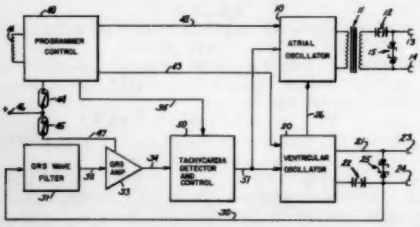
TACHYCARDIA TREATMENT

Barouh V. Berkovits, 179 Woodcliff Rd., Newton Highlands, Mass. 02161, and Ray S. McDonald, 2241 Marion St., St. Paul, Minn. 55113

Continuation of Ser. No. 956,191, Oct. 30, 1978, abandoned. This application Aug. 11, 1980, Ser. No. 177,285

Int. Cl.³ A61N *1/36*

U.S. Cl. 128—419 PG **6 Claims**



1. A heart pacemaker for treatment of tachycardia comprising:

terminal means for connection to a patient's heart for delivering atrial and ventricular stimulation thereto;

generating means for delivering sequential atrial and ventricular electrical stimulation pulses to said terminal means at a predetermined repetition rate;

means for sensing the patient's heart beat and for providing signals in response thereto;

demand control means connected to said sensing means and operative in a demand mode for preventing delivery of said stimulating pulses if a heart beat occurs within a predetermined time interval following a preceding spontaneous or stimulated heart beat;

tachycardia detection and control means connected to receive signals from said sensing means and operatively connected for enabling said generating means to deliver said sequential atrial and ventricular electrical stimulation pulses in an asynchronous mode of operation in response to occurence of heart beats separated by a predetermined plurality of consecutive escape intervals of less than a predetermined duration; and

means for determining said asychronous mode and returning control of delivering said pulses to said demand control when the escape interval between successive sensed beats exceeds a second predetermined duration which is larger than said first-mentioned predetermined duration.

4,421,115

ELECTRIFICATION ATTACHMENT FOR AN OSTEOSYNTHESIS IMPLANTATE

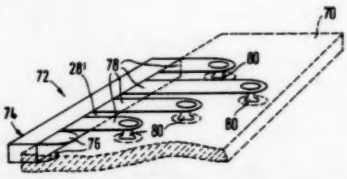
Werner Kraus, Kaulbachstrasse 71, D-8000 München 22, Fed. Rep. of Germany

Division of Ser. No. 944,917, Sep. 25, 1978, Pat. No. 4,306,564. This application Dec. 8, 1980, Ser. No. 214,099

Claims priority, application Fed. Rep. of Germany, Sep. 22, 1977, 2742741

Int. Cl.³ A61N *1/18*

U.S. Cl. 128—419 F **18 Claims**



1. An attachment for converting an osteosynthesis plate (70) into an electrified osteosynthesis plate,

in which the osteosynthesis plate is adapted for attachment to a bone of a patient by at least one metallic bone screw,

said attachment (72) comprising

at least one support body formed as an elongated, strip-like element of a dimension adapted to fit adjacent a surface of said plate;

an induction pick-up coil (24, 24*a*, 24*b*) located in the body and having at least two terminals;

a plurality of members (76, 78) supported by and protruding from the body forming projecting fingers adapted to grip around another surface of said plate to mechanically secure the body (74) to the plate (70);

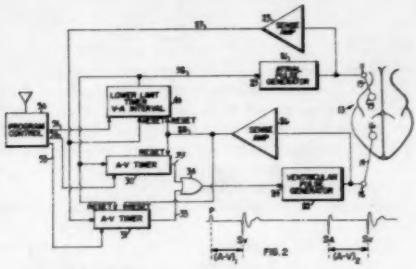
a connecting device (80) for electrical and mechanical connection to the bone screw, insulated with respect to the plate, formed on at least one of said fingers (78), said connecting device being electrically connected to at least one of said terminals, the bone screw serving as a tissue electrode for electrically connecting the one terminal to the tissue of the patient;

and means for electrically connecting another of the at least two terminals to the tissue of the patient.

4,421,116
HEART PACEMAKER WITH SEPARATE A-V INTERVALS FOR ATRIAL SYNCHRONOUS AND ATRIAL-VENTRICULAR SEQUENTIAL PACING MODES

H. Toby Markowitz, Anoka, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.

Continuation of Ser. No. 196,473, Oct. 14, 1980, abandoned.
This application Mar. 10, 1982, Ser. No. 356,791
Int. Cl.³ A61N 1/36
U.S. Cl. 128—419 PG 6 Claims



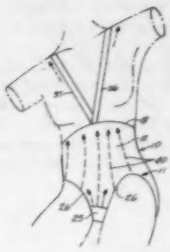
1. A heart pacemaker, comprising:
atrial and ventricular terminal means for connection respectively to the atrium and ventricle of a patient's heart;
atrial and ventricular pulse generating means connected for selectively delivering stimulating pulses to said atrial and ventricular terminal means;
atrial sensing means connected to said atrial terminal means, and operative for sensing atrial contractions of the patient's heart; and
timing control means operatively connected to said atrial sensing means and said atrial and ventricular pulse generating means, and operative in response to a sensed atrial contraction to cause said ventricular pulse generating means to deliver a stimulating pulse at the end of a first atrial-ventricular delay interval from said sensed atrial contraction, and operative in the absence of sensed atrial contractions to cause said atrial and ventricular pulse generating means to deliver sequential stimulating pulses at a predetermined pacing rate, with said atrial and ventricular sequential pulses being separated in time by a second atrial-ventricular delay interval which is independent of said first atrial-ventricular delay interval.

4,421,117
MATERNITY GARMENTS

Jack H. Klausen, and Glori J. Klausen, both of Westlake Village, Calif., assignors to Glori-Us Sportswear, Inc., Newbury Park, Calif.

Filed Mar. 31, 1983, Ser. No. 480,782
Int. Cl.³ A41C 1/00
U.S. Cl. 128—555 13 Claims

1. A maternity garment, comprising:
a yoke panel configured to extend from an upper edge adjacent the lower neck of a wearer to a lower edge adjacent the waistline, the yoke panel being of sufficient width to cover and extend sideways from the backbone to generally vertical lateral edges, and being formed from a first material which is substantially inelastic when stressed in the vertical direction generally parallel to the backbone;
a support pantie covering the lower trunk of the wearer, and having a seat portion with an upper edge secured to the lower edge of the yoke panel, a front portion enclosing the abdomen and having an upper edge at about the waistline, a pair of midback portions positioned on opposite sides of and secured to the side edges of the yoke panel and to the top of the seat portion, the seat and midback portions extending forwardly around the body to join the front portion, and a crotch panel secured to lower ends of the front and seat portions to define a pair of leg openings, the front, seat, and midback portions being made of a second material which is highly elastic and expandable in a generally horizontal axis normal to the backbone, and substantially less elastic and therefore supportive in a generally vertical axis parallel to the backbone; and

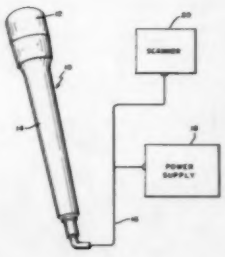


attachment means configured to fit over the wearer's shoulders and connecting an upper part of the front portion and the upper part of the yoke panel to apply an upwardly directed tensioning force to the support pantie to support and urge the abdomen upwardly and rearwardly.

4,421,118
ULTRASONIC TRANSDUCER

Julian Dow, Mountain View, and Paul F. Meyers, Sunnyvale, both of Calif., assignors to SmithKline Instruments, Inc., Sunnyvale, Calif.

Filed Aug. 12, 1981, Ser. No. 292,053
Int. Cl.³ A61B 10/00
U.S. Cl. 128—660 12 Claims



1. An ultrasonic transducer comprising:
an elongated handle enclosing a motor adapted to impart linear reciprocating motion, said motor including
a plurality of magnets disposed so as to have like magnetic poles of adjacent magnets facing each other;
a plurality of iron spacers, each being disposed between adjacent magnets, said magnets and spacers being disposed in a non-magnetic case for forming a stack;
a coil form disposed concentrically over said stack of magnets and spacers;
a plurality of serially connected oppositely wound electrical coil windings axially disposed along said coil form, each coil being located opposite a respective spacer;
a magnetic case disposed concentrically around said stack, coil form and coil windings;
means for securing said stack stationary with respect to said magnetic case, and
electrical means coupled to said coil windings for providing

an electrical current for energizing said windings thereby to cause said coil form and stack to undergo linear displacement relative to each other;

a transducer head assembly having an ultrasonic energy transmissive window joined to said handle and enclosing a crystal holder containing a crystal adapted to transmit and receive ultrasonic energy through said window;

a stationary base disposed in said head;

mechanical linkage means coupling said crystal holder to said base, and

drive means coupling said motor to said mechanical linkage means for causing said crystal holder and crystal, when driven by said motor, to undergo reciprocating swinging motion relative to said base for transmitting ultrasonic energy to and receiving echo signals from an object in front of said window in a sector scanning motion.

4,421,119

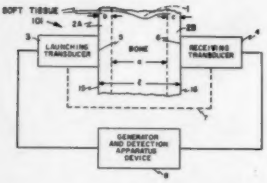
APPARATUS FOR ESTABLISHING IN VIVO, BONE STRENGTH

George W. Pratt, Jr., Wayland, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Division of Ser. No. 48,580, Jun. 15, 1979, Pat. No. 4,361,154, which is a continuation-in-part of Ser. No. 928,654, Jul. 28, 1978, Pat. No. 4,233,845. This application Dec. 11, 1981, Ser. No. 329,932

Int. Cl.³ A61B *10/00*

U.S. Cl. 128—660 **2 Claims**



1. Apparatus for establishing, in vivo, the strength of a bone member, that comprises, in combination:

a linear scale;

first transducer means having a sending surface to launch an acoustic pulse through the bone member;

second transducer means having a receiving surface to receive the pulse after transmission through the bone member, said receiving surface being parallel to and facing said sending surface so that said bone member may be positioned between and in contact with both of said surfaces;

said first and second transducer means being mechanically interconnected by said linear scale so that the distance between said sending surface and said receiving surface may be measured; and

means for measuring the transit time of the pulse from the first transducer means to the second transducer means to permit determination of the velocity of the propagated signal through the bone.

4,421,120

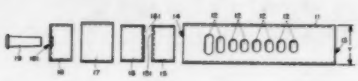
PEAK RESPIRATORY FLOW MONITOR

Rodney Edwards, Jr., Framingham; John W. Burke, Jr., Melrose, and Peter Gazzara, Reading, all of Mass., assignors to Biotrine Corporation, Woburn, Mass.

Filed Mar. 2, 1981, Ser. No. 239,272

Int. Cl.³ A61B *5/02*

U.S. Cl. 128—725 **6 Claims**



3. A peak respiratory flow monitor comprising:

(a) an elongated tubular member, having (i) a front end serving as an air input port, (ii) a series of openings through the wall of the tubular member, (iii) an input flow axis, passing through the center of the input port, in the direction of air flow at the air input, and (iv) a rear end opposite to the front end;

(b) means for covering a desired number of the openings; and

(c) means, having an air flow input, for generating a signal when the air flow therethrough reaches a threshold, such means being called below "the whistle", wherein the whistle includes a reed and means for causing displacement of air flow, from the input flow axis, prior to flowing along the reed, and also includes a chamber, in which the reed is mounted, such chamber having a flow input, being the whistle input, which is mounted proximate to the rear end of the tubular member, such whistle input including a first baffle disposed transversely to the longitudinal axis of the tubular member, such baffle having an aperture the center of which is located off the longitudinal axis; and

(d) a valve for regulating flow through the input of the whistle.

4,421,121

METHOD AND APPARATUS FOR OBTAINING A NON-CEPHALIC REFERENTIAL ELECTROENCEPHALOGRAM

John W. Whisler, 1489 Albert St. North, Saint Paul, Minn. 55108, and Walter J. Re Mine, 783 Iglehart Ave., Saint Paul, Minn. 55104

Filed Oct. 3, 1980, Ser. No. 193,832

Int. Cl.³ A61B *5/04*

U.S. Cl. 128—731 **9 Claims**

1. A method for obtaining the electroencephalogram (EEG) which involves,

I. attaching an electrode means (**10**) at or below the base of the neck,

connecting the electrode means (**10**) to circuit ground or common (**14**),

attaching at least three electrode means (**28**) at or below the base of the neck,

connecting each electrode means (**28**) to an amplifying means (**32**),

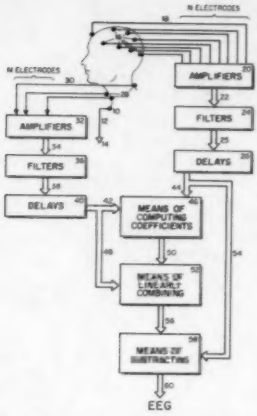
attaching electrode means (**16**) to the head of the subject,

connecting the electrode means (**16**) to amplifying means (**20**),

II. then,

linearly combining the output signals of amplifying means (**32**) by multiplying each output of said amplifying means (**32**) by a separate adjustable coefficient and summing the results of said multiplications, thereby producing a reference signal,

and subtracting said reference signal from the output signals of amplifying means (20) thereby obtaining the EEG, and



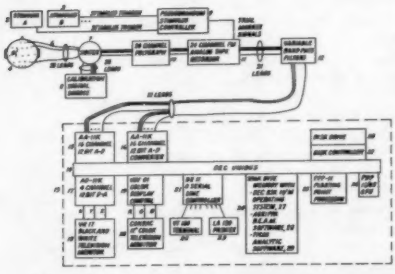
III. adjusting the said adjustable coefficients to reduce the electrocardiographic artifact in the EEG.

4,421,122

BRAIN ELECTRICAL ACTIVITY MAPPING

Frank H. Duffy, Brookline, Mass., assignor to The Children's Medical Center Corporation, Boston, Mass.

Filed May 15, 1981, Ser. No. 263,939
Int. Cl.³ A61B 5/04
U.S. Cl. 128—731 **43 Claims**



1. Apparatus for generating a topographic display of information on the electrical activity of the brain, said apparatus comprising

a plurality of electrical-activity transducers adapted for placement at spaced apart locations on the skull of a patient,

stimulus means for repeatedly generating a sensory stimulus for the brain to produce at said transducers repeated segments of data each associated with one EP response, said stimulus means including

pseudorandom timing means for triggering successive said stimuli at times spaced apart by pseudorandom time intervals, and for determining each said pseudorandom time interval as a combination of a subinterval of fixed length and a subinterval of pseudorandomly determined length, each said fixed length subinterval comprising a prestimulus subinterval of predetermined length and a poststimulus subinterval of predetermined length,

averaging means connected to be responsive to said transducers for averaging said repeated segments to generate average segments for each transducer,

processing means connected to be responsive to said averaging means for processing said average segments to generate one or more matrices, each element said one or more matrices representing information on the electrical activity of the brain at one location on the skull,

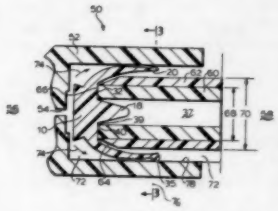
display means connected to be responsive to said processing means for displaying said one or more matrices as topographic maps of the skull, each said matrix element forming a discrete point of said maps.

4,421,123

MULTIPLE SAMPLE NEEDLE VALVE

Edward P. Percarpio, North Haledon, N.J., assignor to Becton Dickinson and Company, Paramus, N.J.

Filed Nov. 30, 1981, Ser. No. 325,704
Int. Cl.³ A61B 5/14
U.S. Cl. 128—766 **11 Claims**



1. A cup valve apparatus for a multiple blood sample assembly, comprising

(a) an annular valve body;

(b) an annular valve skirt having an upper and lower end, said valve skirt depending from said valve body at the upper end of said skirt and integral therewith, said skirt diverging from the axis of said body;

(c) an integral support protrusion extending from said valve body centrally of said skirt along the axis of said body;

(d) a flattened annular projection extending from said body on the side thereof opposite said skirt and said protrusion, said projection being coaxial with said body;

the improvement characterized by

(e) an integral annular spike on said skirt adjacent the lower end thereof; and

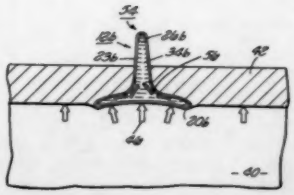
(f) said spike extending radially from the side wall of said skirt.

4,421,124

PRESSURE DETECTION ARRANGEMENT

Lee Marshall, 2808 Oregon Ct., J-3, Torrance, Calif. 90503

Division of Ser. No. 51,431, Jun. 6, 1979, Pat. No. 4,286,603.
This application Jun. 8, 1981, Ser. No. 271,794
Int. Cl.³ A61B 5/10
U.S. Cl. 128—782 **4 Claims**



1. A pressure detection arrangement for placement interme-

diate a part of the body means surrounding the part of the body and comprising, in combination:

capsule comprising:

a reservoir means having first walls and second walls defining a reservoir cavity, and said first walls further defining a lower portion of said reservoir cavity having a first predetermined flexibility, and said second walls further defining an upper portion of said reservoir cavity having a second predetermined flexibility;

an indicator means having third walls defining an indicator cavity having a third predetermined flexibility and having a preselected transmissivity for electromagnetic radiation in the visible portion of the electromagnetic radiation spectrum to allow visual inspection therethrough of said indicator cavity;

said first walls coupled to said second walls;

said second walls further defining a first aperture through said second walls;

said third walls coupled to said second walls adjacent said first aperture; and

a separation means comprising a frangible disc across said first aperture to close communication between said reservoir cavity and said indicator cavity; and

an indicator fluid in said reservoir cavity said separation means responsive to a predetermined pressure exerted on said indicator fluid in said reservoir cavity to fracture said frangible member to allow said indicator fluid to enter said indicator cavity and said separation means separating said indicator fluid from said third walls of said indicator means for the condition of said reservoir cavity subjected to less than said predetermined pressure.

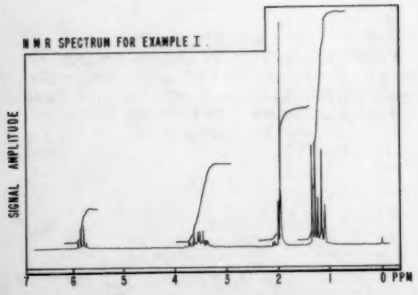
4,421,125
SMOKING TOBACCO COMPOSITION OR SMOKING TOBACCO ARTICLE CONTAINING 1-ETHOXY-1-ETHANOL ACETATE AND ACETALDEHYDE

Richard M. Boden, Monmouth Beach, N.J., assignor to International Flavors & Fragrances Inc., New York, N.Y.

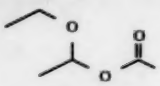
Division of Ser. No. 287,935, Jul. 29, 1981, Pat. No. 4,348,416, which is a continuation-in-part of Ser. No. 176,111, Aug. 7, 1980, Pat. No. 4,296,137. This application Mar. 26, 1982, Ser. No. 362,270

Int. Cl.³ A24B *3/12, 15/30*

U.S. Cl. 131—276 **3 Claims**



1. A process for augmenting or enhancing the aroma or taste of a smoking tobacco comprising the step of adding to a smoking tobacco composition an aroma or taste augmenting or enhancing quantity of a mixture of 1-ethoxy-1-ethanol acetate having the structure:



and acetaldehyde, the range of weight ratios of 1-ethoxy-1-ethanol acetate:acetaldehyde being from 50:50 down to 5:95.

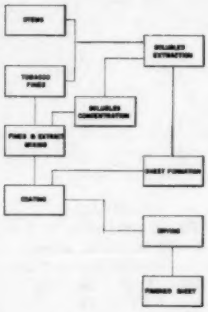
4,421,126
PROCESS FOR UTILIZING TOBACCO FINES IN MAKING RECONSTITUTED TOBACCO

Grant Gellatly, Chester, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Filed Jun. 4, 1981, Ser. No. 270,450

Int. Cl.³ A24B *3/14*

U.S. Cl. 131—371 **6 Claims**



1. A method for employing tobacco fines in the preparation of reconstituted tobacco which comprises:

(a) separating fines from a feedstock to a reconstitution process,

(b) slurrying and refining the feedstock absent the separated fines in an aqueous medium, and removing from the refined slurry the greater part of the liquid phase and replacing it with white water from step (c),

(c) supplying the refined slurry to a paper making machine for preparing reconstituted tobacco sheet and forming a sheet therefrom, and recovering white water from said machine,

(d) combining the separated fines from step (a) with a second aqueous medium,

(e) treating the combination from step (d) to form a uniform dispersion of the fines, and

(f) applying the dispersion from step (e) as a coating to the sheet from step (c) before said sheet is introduced to dryers.

4,421,127
COMPACT CASE WITH INTERCHANGEABLE COSMETIC INSERTS

Marjorie Geer, 2429 Ridge Road Dr., Alexandria, Va. 22302

Filed Sep. 20, 1982, Ser. No. 420,367

Int. Cl.³ A45D *33/00*

U.S. Cl. 132—83 R **15 Claims**

1. A compact case for housing cosmetic material comprising in combination:

a top cover;

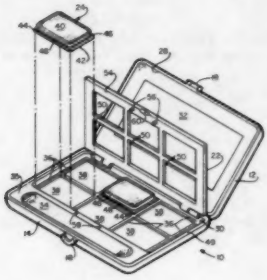
a bottom support tray including on the interior surface thereof a system of integral upstanding ribs defining a matrix configuration of areas each having predetermined dimensions and geometric shapes;

an intermediate lid having a top and bottom surface posi-

tioned between said top cover and said support tray and defining a matrix configuration of openings registrably corresponding to said matrix configuration of areas;

hinge means connecting said top cover, said support tray and said intermediate lid for relative hinged movement with respect to one another between open and closed positions,

cosmetic containing means corresponding in number to said matrix configuration of areas, each of said cosmetic containing means including a base defining a perimetrical substantially vertrical edge having substantially the identical dimension and geometric shape of a selected one of



said areas for close fitting relationship with said upstanding ribs defining said selected one, a neck member vertically extending above said base and positioned interiorly of said perimetrical edge thereby defining a horizontal ledge circumferentially surrounding said neck member, said neck member defining a cavity to accept and contain a pedetermined amount of cosmetic material therein, wherein each of said neck members registers with a predetermined one of said openings while a portion of the bottom surface of said lid presses against said ledge when said lid is in said closed position to restrain each of said cosmetic containing means in each of said selected ones of said areas.

4,421,128

COMPACTED GREASELESS COSMETIC STICK AND PARTICULARLY STICK OF EYE SHADOW

Jean Boulogne, L'Hay-Les-Roses; Tibaud Hochmann, Champigny-s/Marne; Jacques Michelet, Longjumeau, and Bruno Morane, Paris, all of France, assignors to L'Oreal, Paris, France

Continuation of Ser. No. 703,362, Jul. 8, 1976, abandoned. This application Feb. 15, 1979, Ser. No. 12,518

Int. Cl.³ A45D *40/30*

U.S. Cl. 132—88.5 **11 Claims**

1. A greaseless make-up stick of the chalk type which is particularly adapted for direct application to the eyelids, said greaseless make-up stick comprising a dry compacted admixture of

(1) 25–75% of a greas 'ess carrier powder,

(a) which has substantially rounded grains, the average diameter of which is between 1 and 20 microns, and

(b) which is selected from the group consisting of rice starch, corn starch and esterified rice starch, esterified corn starch and polyamide powders, and

(2) at least one make-up pigment,

said compacted admixture having a hardness less than calcium carbonate when compacted at room temperature and under a pressure of 120 bars.

4,421,129

SHAPED ARTICLES FOR RAPID HAIR DRYING UTILIZING POLYMER BLENDS

Steve G. Wingard, 419 Lyndhurst Rd., Columbia, S.C. 29210

Filed Aug. 12, 1982, Ser. No. 407,590

Int. Cl.³ A45D *1/00*

U.S. Cl. 132—163 **8 Claims**

1. A shaped article for rapidly drying hair, comprising:

rigid means engaging the hair, for absorbing water therefrom, said rigid means made from a hydrolized graft starch copolymer selected from the group consisting of:

starch, acrylamide and sodium acrylate, or

starch, acrylamide and potassium acrylate, or

starch, polyacrylate and polyacrylamide,

whereby water is absorbed from the hair by hydroscopic action of said graft starch copolymer.

4,421,130

CORROSION PROTECTION PRETREATING APPARATUS

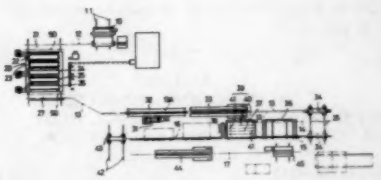
Takao Kataishi, and Nobufumi Yokoi, both of Tokyo, Japan, assignors to Misawa Home Co., Ltd., Tokyo, Japan

Filed Nov. 12, 1981, Ser. No. 320,627

Claims priority, application Japan, May 30, 1981, 56-82712

Int. Cl.³ B08B *3/04*

U.S. Cl. 134—76 **5 Claims**



1. A corrosion protection pretreating apparatus comprising:

a plurality of treating tanks including a pickling tank, rinsing tanks and the like;

a carry-in section for articles to be treated, provided at one side of a section of said treating tanks;

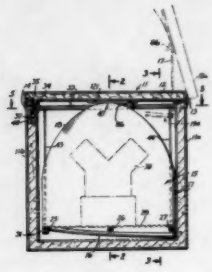
a carry-out section for the articles to be treated, provided at the other side of the section of the plurality of treating tanks;

a plurality of carrier bars capable of supporting the articles to be treated, being carried into said carry-in section for the articles to be treated and being transferred together with the articles to be treated to said carry-out section for the articles to be treated;

a first transfer device being movable between said carry-in section for the articles to be treated and predetermined positions over the plurality of treating tanks and having a lifting mechanism for supporting one or more of said carrier bars and vertically moving the carrier bar or bars; and

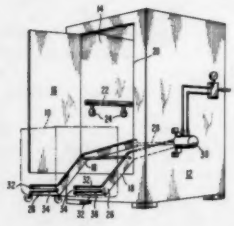
a second transfer device being movable between predetermined positions over the plurality of treating tanks and said carry-out section for the articles to be treated with its scope of movement being partially overlapped with that of the first transfer device and having a lifting mechanism for supporting one or more of said carrier bars and vertically moving the carrier bar or bars.

4,421,131
CLEANING APPARATUS
Raymond G. Auvil, Jr., P.O. Box 789, Lone Pine, Calif. 93545
Filed Jan. 19, 1982, Ser. No. 340,736
Int. Cl.[3] B08B *3/04*
U.S. Cl. 134—104 **12 Claims**



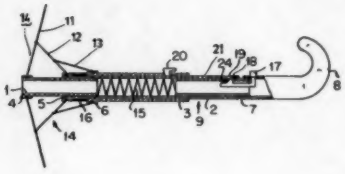
1. Cleaning apparatus comprising:
a tank for containing a cleaning liquid,
a basket for supporting an item having sediment adhering thereto,
said basket having an imperforate floor,
one side of said tank and said floor forming an opening therebetween, and
drive means for lowering said basket from a raised position to a lowered position in said liquid to convey the portion of said liquid below said floor through said opening and over said item, whereby to cause said portion of said liquid to sweep any sediment from the bottom of said tank through said opening and to deposit said sediment on top of said floor.

4,421,132
CART WASHING APPARATUS
Henry Y. Kuhl, Kuhl Rd., Flemington, N.J. 08822
Filed Apr. 23, 1982, Ser. No. 371,036
Int. Cl.[3] B08B *3/02, 9/08*
U.S. Cl. 134—123 **14 Claims**



1. A cart washing means comprising:
(a) a housing means defining a washing chamber therein, said housing means defining an access opening in one wall thereof;
(b) a fluid piping means extending throughout said washing chamber to deliver washing and rinsing fluid therein;
(c) a plurality of nozzle means positioned in said fluid piping means and in fluid flow communication with respect to the fluid therein for delivering, washing and rinsing fluid throughout said washing chamber;
(d) a drive shaft rotatably mounted within said housing means;
(e) a drive means secured with respect to said drive shaft and operable to cause rotation of said drive shaft responsive to actuation of said drive means;
(f) arm means fixedly secured with respect to said drive shaft to move upwardly responsive to rotation of said drive shaft;
(g) cart gripping means fixedly secured with respect to said arm means and adapted to selectively secure a cart with respect to said arm means to operably lift the cart into said washing chamber of said housing means to wash and rinse same responsive to actuation of said drive means and rotation of said drive shaft.

4,421,133
UMBRELLA
Yueh Huang, No. 60, Fu-Ho Rd., Yung-Ho City, Taiwan
Filed Sep. 22, 1981, Ser. No. 304,681
Int. Cl.[3] A45B *25/16*
U.S. Cl. 135—22 **3 Claims**



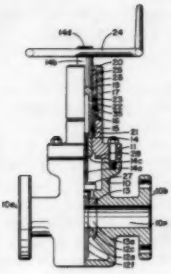
1. An automatic umbrella having a canopy and a frame of interconnected ribs and first and second stretchers comprising:
a telescoping shaft including a middle tube, an outer tube slidably disposed over said middle tube, an upper inner tube and lower inner tube longitudinally offset and slidably disposed inside said middle tube;
a first notch provided at an upper portion of said upper inner tube and pivotably connected to said ribs;
a second notch provided at an upper portion of said middle tube and pivotably connected to said first stretchers;
a third notch provided at an upper portion of said outer tube and pivotably connected to said second stretchers;
a first spring coaxially disposed over said shaft between said second and third notches, said first spring being compressed when said ribs and stretchers spread so as to bias said ribs and stretchers against spreading;
a second spring provided between said upper and lower inner tubes and having ends abutting against the ends of said upper and lower tubes for biasing said upper tube away from said middle tube so as to spread said ribs and stretchers;
first locking means for releasably fixing said outer tube with respect to said middle tube in a position in which said ribs and stretchers are not spread; and
second locking means for releasably fixing said lower inner tube with respect to said middle tube so as to increase the compression of said second spring;
the force exerted by said second spring on said upper inner tube being stronger than the force exerted by said first spring on said middle tube when said second locking means is actuated and being weaker than the force exerted by said first spring on said middle tube when said second locking means is deactuated, so that when said first and second locking means are both actuated and said first locking means is subsequently released, said second spring urges said upper inner tube and said outer tube upward with respect to said middle tube, compressing said first spring to enable subsequent extension to close the umbrella when said second locking means is subsequently deactuated.

4,421,134

HEAT SENSITIVE GATE VALVE

Billy R. Bruton, and David E. Snyder, both of Longview, Tex., assignors to Axelson, Inc., Longview, Tex.

Filed Sep. 10, 1982, Ser. No. 416,686
Int. Cl.³ F16K *13/04*
U.S. Cl. 137—72 8 Claims



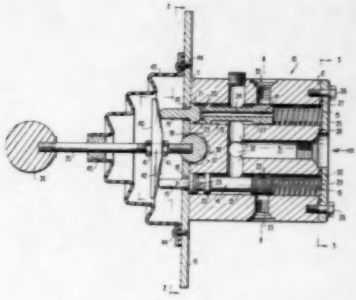
1. A gate valve comprising a valve body having inlet and outlet ends with means at each of said ends for connecting the valve to flow conduits; a flowway between such ends; a chamber intersecting the flowway and opening to one side of the valve body; a bonnet sealably connected to the valve body and having a bore therethrough aligned with the chamber opening; a pair of annular spaced apart seats opposing each other and each having an opening therethrough coaxial with said flowway; a gate having parallel outwardly facing seating surfaces disposed between said seats at all times and reciprocal therebetween, said gate having an imperforate portion positionable between the seats and across the flowway to prevent flow therethrough when the gate is moved to valve closed position and also having a port therethrough to be brought into alignment with the seats and the flowway to permit flow therethrough when the gate is in valve open position; actuating means for moving the gate between said valve closing and open positions including a valve stem attached to the gate and extending through the bore of the bonnet to the exterior of the bonnet; seal means between the stem and bonnet permitting movement of the stem while preventing escape of fluids from the bonnet; means for moving the stem outwardly consisting of the stem having an inner end exposed to line pressure within the valve body and an outer end exposed to atmospheric pressure exteriorly of the valve body such that a differential pressure effectively acts on the cross-sectional area of the stem within the seal means to provide the sole force to urge the stem outwardly of the valve body; said actuating means including a heat fusible element located outwardly of said seal means and disposed between opposing shoulders on the bonnet and the stem to transmit force developed by said actuating means to reciprocate the gate between valve closed and valve open positions but upon melting, being displaced by the stem being moved outwardly by said differential pressure so that said differential pressure will act on the stem to move it outwardly a distance that said gate will be moved fully from one of its valve closed and valve open positions to the other of such positions, said fusible element having a length at least equal to the distance said stem must move outwardly said distance.

4,421,135

HYDRAULIC SELECTOR VALVE HAVING JOY STICK CONTROL

Ronald W. Harshman, Greencastle, and Lynn A. Dietrich, Chambersburg, both of Pa., assignors to Walter Kidde & Company, Inc., Clifton, N.J.

Continuation of Ser. No. 11,762, Feb. 12, 1979, Pat. No. 4,296,773. This application Feb. 4, 1981, Ser. No. 231,404
The portion of the term of this patent subsequent to Oct. 27, 1998, has been disclaimed.
Int. Cl.³ F16K *29/00*
U.S. Cl. 137—312 2 Claims

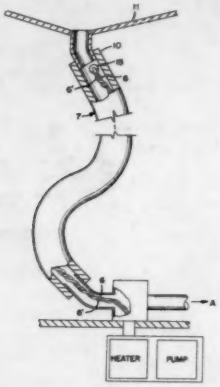


1. A selector valve comprising a valve body having plural spaced parallel bores, motive fluid inlet passage means leading to said bores and plural motive fluid delivery ports corresponding in number to said bores and leading from the bores, a valve spool positioned in each said bore of the valve body and being biased to a closing position in relation to the adjacent delivery port and having an extension on one end thereof projecting exteriorly of the valve body at one end thereof, a joy stick controller for said valve spools and having a universal swiveled connection with the valve body at said one end and between said bores, said universal swiveled connection comprising a ball head on one end of the joy stick controller, a swivel recess for the ball head in said one end of said valve body, a substantially planar mounting plate secured to said one end of said valve body and overlying said bores and contacting the said one end of the valve spools to retain the latter in said bores, clearance openings in said mounting plate smaller than the diameter of said bores through which the valve spool extension project exteriorly of the mounting plate, said mounting plate having a cooperating swivel recess for the ball head adjacent to and in registration with the first-named swivel recess, said mounting plate retaining a major portion of the ball head engaged within the first-named swivel recess in said valve body and below the plane of said mounting plate, and an actuating disc mounted on said joy stick controller exteriorly of the valve body at said one end thereof in spaced opposing relationship to said mounting plate and cammingly engaged all of said valve spool extensions and movable with the joy stick controller to selectively shift a single spool or a pair of such spools to an open position in relation to a single delivery port or a pair of such ports of the valve body, and said actuating disc having a diameter and a spacing from said mounting plate dimensioned such that during operation of the joy stick controller the peripheral portion of said actuating disc is adapted to engage said mounting plate to form a positive stop to limit movement of the joy stick controller in all directions, whereby not only does the mounting plate cooperate with the disc to provide a limit stop for the joy stick but also the mounting plate retains the ball head and spool valves within the valve body.

4,421,136
FLEXIBLE TUBULAR CONDUIT FOR TRANSFERRING FLUIDS PARTICULARLY AT HIGH TEMPERATURE AND/OR PRESSURE AND PIPING COMPRISING SUCH A CONDUIT

Jean-Paul Aubert, Puteaux, France, assignor to Coflexip, Paris, France

Filed Feb. 27, 1981, Ser. No. 239,126
Claims priority, application France, Feb. 28, 1980, 80 04439
Int. Cl.³ F16K *49/00*
U.S. Cl. 137—340 **8 Claims**



1. A drain pipe arrangement for draining water from a floating roof of a storage reservoir comprising, a flexible drain pipe connected to a drain connection at the roof, said drain pipe having a water flow passage therein, said pipe extending downwardly and having a discharge end to discharge water flowing through the flow passage in the pipe, a flexible heating element within said flow passage and extending the length of the drain pipe, said heating element comprising at least two rigid metal tubes twisted on each other, means connecting said metal tubes together at a location near the roof so that a heating fluid can be introduced into one of the tubes and returns through another tube, means for circulating a heating fluid through said rigid metal tubes within said drain pipe, from a location adjacent a lower portion of said drain pipe.

4,421,137
PLUG ASSEMBLY FOR SEALING A PRESSURE FLUID PASSAGE IN A MANIFOLD OR THE LIKE

Kay T. Nusbaumer, Fort Wayne, and Terrell R. Whitaker, Huntington, both of Ind., assignors to PHD, Inc., Fort Wayne, Ind.

Filed Feb. 2, 1981, Ser. No. 230,378
Int. Cl.³ F16L *55/12*
U.S. Cl. 138—89 **11 Claims**

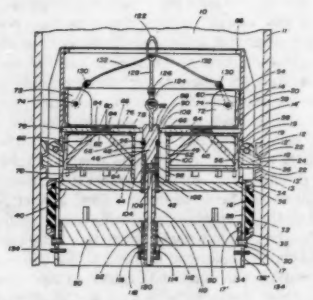
1. A plug assembly for plugging the opening of a cylindrical passage comprising a generally cylindrical but out of round expansion sleeve having a socket portion, an expanding nut engageably received by said socket portion, one of said nut and socket portion being tapered such that said sleeve is radially expanded as said nut enters more deeply into said socket portion, the outer periphery of said sleeve being circumferentially continuous and uninterrupted, the engageable portions of said nut and socket being circumferentially continuous and uninterrupted, a screw element threadedly received by said nut and through a clearance opening in said sleeve, said screw element having a head engaged with said sleeve on the side thereof axially opposite said socket portion whereby threading of said screw element into said nut draws the latter more deeply into said socket portion, and the outer periphery of said sleeve being out of round by a predetermined degree to provide for an interference fit with a bore which is round in cross-section, said sleeve periphery being adapted to provide a circumferential seal with a bore in which it is mounted, said engageable portions of said nut and socket being in a circumferential sealing engagement and said nut sealing against the threads of said screw element when the latter is tightened and said sleeve is sealed within a bore.

7. The method of fabricating a plug assembly for plugging the opening of a cylindrical passage wherein said plug assembly comprises a cylindrical expansion sleeve which is circumferentially continuous and uninterrupted, and having a socket which engageably receives a tapered expanding nut, said nut being of smaller diameter than said sleeve, the engageable portions of said nut and socket being circumferentially continuous and uninterrupted, a screw element threadedly received by said nut and through a clearance opening in said sleeve, a head on said screw element engaging the side of said sleeve axially opposite said socket; said method comprising the steps of threading said screw element into said nut for tightening said nut into said socket with a predetermined force, radially compressing said sleeve until said clearance opening bottoms onto said screw element and radially deforming said sleeve whereby the outer periphery is out of round.

4,421,138
DOG LOCKING SLEEVE

R. Benton Nickles, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Continuation of Ser. No. 194,185, Oct. 6, 1980, abandoned. This application Jul. 23, 1982, Ser. No. 401,440
Int. Cl.³ F16L *55/12, 55/10*
U.S. Cl. 138—89 **1 Claim**



1. A removable plug for temporarily sealing the interior of an annular member of a marine structure having a plug retaining means secured therein, said annular member and plug retaining means having a predetermined diameter and predetermined diametrical variations in the predetermined diameter, to prevent the flow of fluid therethrough, said removable plug comprising:

plug body means adapted to be disposed within said annular member, the plug body means comprising:

packer mandrel means having a substantially cylindrical shape having a predetermined diameter having, in turn, substantial predetermined diametrical dimensional variations therein throughout the length of the packer man-

drel means, a plurality of apertures therein and a plug therein for preventing the flow of said fluid therethrough, the plug having a centrally located sleeve therein;

packer member means located on the packer mandrel means for sealingly engaging the interior of said annular member;

packer setting sleeve means located on the packer mandrel means for compressing the packer member means into sealing engagement with the interior of said annular member;

locking dog means pivotally mounted on the packer mandrel means for retaining said plug from axial movement when installed in said annular member, the locking dog means comprising:

a plurality of members pivotally mounted on the packer mandrel, each member having a portion thereof adapted to engage a portion of the plug retaining means secured to the interior of said annular member when said plug is installed therein and being rotatable through an aperture of the plurality of apertures in the packer mandrel means;

pressure equalization plug means releasably secured within the centrally located sleeve of the packer mandrel means for allowing the flow of said fluid through said plug when said plug is installed in said annular member thereby allowing the pressure of said fluid to substantially equalize in said annular member and across said plug before the removal of said plug from said annular member; and

dog locking sleeve assembly means slidable within the packer mandrel means between a first position wherein the locking dog means abut a portion of the exterior surface of the dog locking sleeve assembly means thereby preventing rotation of the locking dog means through the apertures in the packer mandrel means and a second position wherein the locking dog means are free to rotate through the apertures in the packer mandrel means thereby disengaging the interior of said annular member when said plug is installed therein to allow the removal of said plug from said annular member, the dog locking sleeve assembly means comprising:

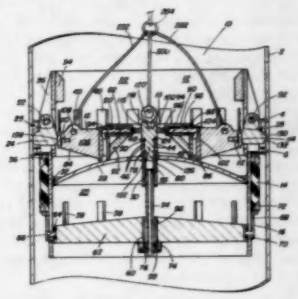
annular cylindrical member means having a first annular cylindrical shoulder means on the exterior surface thereof having a controlled predetermined diameter substantially throughout the length thereof, which predetermined diameter compensates for the predetermined diametrical variations in the predetermined diameter of said plug retaining means, said annular member of said marine structure and the packer mandrel means, adapted to slidingly engage a portion of the locking dog means to ensure satisfactory engagement of the locking dog means with said plug retaining means while eliminating any excessive clearance between the packer mandrel and the annular cylindrical member means, the predetermined diameter of the first annular cylindrical shoulder being more closely controlled than the diameter of the packer mandrel means, being more closely controlled than the diameter of said plug retaining means, and being more closely controlled than the diameter of said annular member of said marine structure, having an annular recess means in the exterior surface thereof extending throughout a portion of the exterior surface of the dog locking sleeve to minimize the area of the exterior surface in contact with the interior of the packer mandrel means and having a second annular cylindrical shoulder means on the exterior surface thereof having, in turn, a predetermined diameter more closely controlled than the diameter of the packer mandrel means, adapted to slidingly engage the interior of the packer mandrel means, the dog locking sleeve means having a ratio of axial length to the diameter of the first annular shoulder means of greater than approximately 0.3 to preferably not greater than 0.5 to minimize the cocking and binding of the dog locking sleeve means within the packer mandrel means whereby the annular cylindrical member means of the dog locking sleeve assembly means of said plug requires an amount of force to cause sliding of the annular cylindrical member means within the packer mandrel means less than the amount of force necessary to cause the sliding of an annular cylindrical member having a continuous uninterrupted exterior surface in a packer mandrel means.

4,421,139

PLUG FOR OFFSHORE PLATFORMS AND THE LIKE

R. Benton Nickles, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed May 26, 1981, Ser. No. 266,762
Int. Cl.³ E02B 17/00
U.S. Cl. 138—89 **6 Claims**



1. A removable plug for temporarily sealing the interior of an annular member to prevent the flow of fluid therethrough, said removable plug comprising:

plug body means adapted to be disposed within said annular member, the plug body means comprising:

packer mandrel means having a plurality of apertures therein and having a plug therein for preventing the flow of said fluid therethrough, the plug having a sleeve therein;

packer member means located on the packer mandrel means for sealingly engaging the interior of said annular member;

packer setting sleeve means located on the packer mandrel means for compressing the packer member means into sealing engagement with the interior of said annular member;

locking dog means pivotally mounted on the packer mandrel means for retaining said plug from axial movement when installed in said annular member, the locking dog means comprising:

a plurality of members pivotally mounted on the packer mandrel means, each member having a portion of the exterior thereof adapted to engage a portion of the interior of said annular member when said plug is installed therein, having a portion of the interior thereof including an angular inwardly extending surface terminating in a vertical surface and being rotatable through an aperture of the plurality of apertures in the packer mandrel means;

pressure equalization means releasably secured within the sleeve of the packer mandrel means for allowing the flow of said fluid through said plug when said plug is installed in said annular member thereby allowing the pressure of said fluid to substantially equalize in said annular member and across said plug before the removal of said plug from said annular member; and

dog locking sleeve assembly means slidable within the packer mandrel means between a first position wherein the locking dog means abut a portion of the exterior sur-

face of the dog locking sleeve assembly means thereby preventing rotation of the locking dog means through the apertures in the packer mandrel means and a second position wherein the locking dog means are free to rotate through the apertures in the packer mandrel means thereby disengaging the interior of said annular member when said plug is installed therein to allow the removal of said plug from said annular member, the dog locking sleeve assembly means comprising:

stationary portion means having a portion thereof secured to the plug of the packer mandrel means and having movable pin means therein having one end thereof adapted to engage the exterior of the pressure equalization plug means when the pressure equalization plug means is installed in the sleeve of the packer mandrel means; and

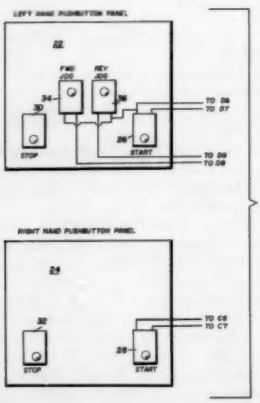
movable portion means including annular member means having a bore therethrough adapted to engage the other end of the movable pin means of the stationary portion means when the pressure equalization plug means is installed in the sleeve of the packer mandrel means to retain the dog locking sleeve means in a first position in the packer mandrel means having the dog locking sleeve means engaging the locking dog means, radial support means having one end thereof secured to the annular member means, and dog locking ring means secured to the other end of the radial support means and having the exterior thereof adapted to engage the vertical surface of the locking dog means when dog locking sleeve means is in a first position in the packer mandrel means and to disengage the locking dog means is in a second position within the packer mandrel means thereby allowing the locking dog means to rotate through the apertures in the packer mandrel means.

4,421,140

DOBBY-ACTIVATED LOOM MOTION LOCK-OUT DEVICE

Danny H. Allen, and John H. Sumner, both of Greensboro, N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

Filed Dec. 17, 1981, Ser. No. 331,833
Int. Cl.³ D03D *51/04*
U.S. Cl. 139—1 E **3 Claims**



1. For a loom which is capable of being run forwards, jogged forwards, jogged in reverse, which is being used in conjunction with a lever-controlled dobby head having a control lever which is shiftably mounted relative to a guide bracket at an operator's control station, for shifting between a RUN position and a REVERSE position, which positions are spaced apart so as to permit the lever to be positioned in an intermediate position which is located between the RUN and REVERSE positions, and wherein the loom is electrically powered by means including electrical circuitry including at least one START/STOP push button switch located at said operator's control station, a FORWARD JOG push button switch located at said operator's control station and a REVERSE JOG push button switch located at said operator's control station,

a control station improvement comprising:

a first microswitch means wired in series with said at least one START/STOP push button switch and with said FORWARD JOG push button switch in said circuitry, said first microswitch means being normally open and having a respective actuator which, only while actuated, keeps said first microswitch means closed;

a second microswitch means wired in series with said REVERSE JOG push button switch in said circuitry, said second microswitch means being normally open and having a respective actuator which, only while activated, keeps said second microswitch means closed;

means mounting the first microswitch means relative to said lever in such a disposition that said actuator of said first microswitch means will be maintained in an actuated condition by engagement with said lever only when said lever is in said RUN position, and mounting the second microswitch means relative to said lever in such a disposition that said actuator of said second microswitch means will be maintained in an actuated condition by engagement with said lever only when said lever is in said REVERSE position, whereby:

said loom may be run forwards or jogged forwards, but not jogged in reverse while said dobby head control lever is in said RUN position,

said loom may be jogged in reverse, but neither run forwards nor jogged forwards while said dobby head control lever is in said REVERSE position, and

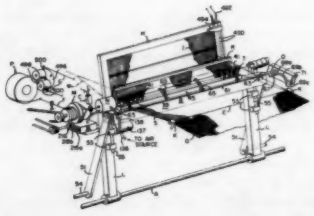
said loom may not be run forwards, may not be jogged forwards and may not be jogged in reverse when said dobby head control lever is in said intermediate position.

4,421,141

FABRIC SELVAGE FORMING

Charles W. Brouwer, East Greenwich, R.I., assignor to Leesona Corporation, Warwick, R.I.

Filed Aug. 6, 1979, Ser. No. 64,391
Int. Cl.³ D03D *47/40*
U.S. Cl. 139—54 **16 Claims**



1. In a method of weaving in which weft strands are inserted in sequence across an open shed defined by plural vertically separated groups of warp strands, each such inserted weft strand having free ends projecting beyond both side edges of the shed, at least some of said groups of warps being reversed in vertical position after each such insertion to close said shed and re-open it in said reversed position and thereby entwine the warp strands sinuously around the sequentially inserted weft strands to form a fabric, each thus inserted weft strand is beat up against the fell of the fabric being formed in timed

relation to the reversal of said groups of warp strands, and the projecting ends of each inserted weft strand are severed adjacent the side edges of the shed before the next weft strand is inserted, the improvement of forming a selvage along each side of said fabric by the steps comprising: guiding a pair of binder strands to the fell of said fabric along each side of said shed, vertically separating said binder strands for the delivery of weft strand therebetween, vertically crossing while mutually twisting together the strands of each said pair of binder strands prior to closing of said shed and severing said projecting weft strand ends to thereby grip said weft strand ends by said binder strands before said weft strand ends are severed, and forming a leno chain stitch by criss-crossing at least two leno threads beneath periodic weft strands and across a terminal plurality of said warp strands along each side of said fabric, said leno threads being criss-crossed above said plural warp strands while said shed is substantially open, said crossed and twisted binder strands being disposed outwardly of said leno chain stitch at the corresponding side of said warp shed.

4,421,142

METHOD FOR THE PRODUCTION OF A FABRIC, PARTICULARLY TAPE FABRIC, LOOM FOR THE PERFORMANCE OF THE METHOD AND FABRIC PRODUCED ACCORDING TO THE METHOD

Jakob Müller, Stansstad, Switzerland, assignor to Textilma AG, Hergiswil, Switzerland

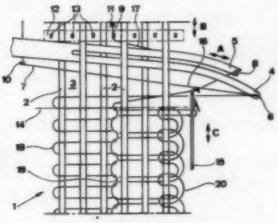
PCT No. PCT/CH80/00131, § 371 Date Jun. 22, 1981, § 102(e) Date Jun. 22, 1981

PCT Filed Oct. 30, 1980, Ser. No. 279,978

Claims priority, application Switzerland, Nov. 8, 1979, 9998/79

Int. Cl.³ D03D *13/00, 47/40*

U.S. Cl. 139—117 **13 Claims**



1. A method of weaving a fabric, particularly a tape fabric, comprising the steps of:

laying into a shed formed of warp threads at least two weft threads by means of weft thread introducing organs arranged laterally of the shed, at least one weft thread being fed, prestored according to programme, to the shed through one of a number of tooth gaps provided in a reed for the passage of the warp threads, forming the weft threads into loops which are laid-in substantially parallel to a fabric beating edge, connecting the loops with one another within the width of the fabric between two adjacent warp threads by crossing the sides of a loop with respective sides of the other loop, while for the formation of a fabric edge from said at least one weft thread fed through the reed, said thread is looped with itself or held by means of at least one auxiliary thread.

7. A loom, particularly a tape loom, comprising:

a loom reed having tooth gaps, feed means for the programmed prestored feeding of at least two weft threads into a shed formed of warp threads passing through respective tooth gaps of the loop reed, said feed means being provided with at least two weft thread guides, at least one of said guides is arranged upstream of the loom reed for guiding one of said two weft threads through one of the loom reed gaps, at least two weft thread introducing organs arranged laterally of the shed in a plane of the fabric being woven and reciprocable across the shed in the machine rhythm such as to form said at least two weft threads into loops connected together within the width of the fabric, and at least one knitting tool reciprocable in the machine rhythm for forming an edge of the fabric from said one weft thread guided through the loom reed.

4,421,143

INDUCTIVE PROJECTILE SENSOR ON A GRIPPER SHUTTLE WEAVING MACHINE

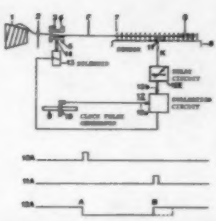
Erich Weidmann, Wetzikon, Switzerland, assignor to Loepfe Brothers Limited, Wetzikon, Switzerland

Filed Dec. 4, 1981, Ser. No. 327,560

Claims priority, application Switzerland, Dec. 13, 1980, 9189/80

Int. Cl.³ D03D *51/40*

U.S. Cl. 139—341 **5 Claims**



1. An electronic control device for a gripper shuttle weaving machine containing a lathe beam and thereto fixed guide teeth for guiding the gripper shuttle which inserts the weft thread into the weaving shed, and a thread brake located at the picking side of the weaving machine, wherein the electronic control device comprises:

a sensor arranged at least at one of the guide teeth for furnishing an electrical sensor signal indicative of the passage of the gripper shuttle;

an evaluation circuit connected to the sensor;

an adjustable delay circuit operatively interconnected between the sensor and the evaluation circuit for delaying the electrical sensor signal; and

an electromagnetic device operatively connected to the evaluation circuit for actuating the thread brake upon appearance of an electrical sensor signal.

4,421,144

FILLING STOP IDENTIFICATION FOR LOOMS

Charles D. Pugh, Raleigh, N.C., assignor to Burlington Industries, Inc., Greensboro, N.C.

Filed Feb. 12, 1982, Ser. No. 348,180

Int. Cl.³ D03D *51/34*

U.S. Cl. 139—370.2 **25 Claims**

1. A loom monitor system for identifying which one of a plurality of filling yarns has broken, comprising:

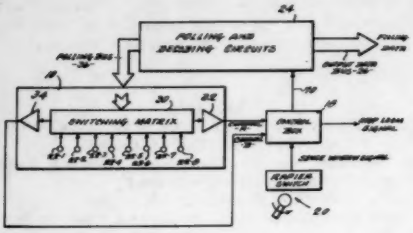
a plurality of sensing means, each associated with one of said plurality of filling yarns, each for generating a sensing signal indicative of movement of its associated yarn;

polling means for sequentially polling the plurality of sensing means and generating data indicative of the sensing means being polled;

signal storage means responsive to said sensing signal generated by a polled sensing means for temporarily storing the data generated by the polling means, thereby identifying a yarn currently being drawn; and

data transfer means responsive to said polling means and to the loom being restarted after a filling yarn break causing

a loom stop for transferring the data temporarily stored and indicative of the first yarn being drawn through the



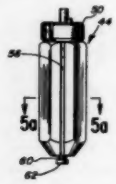
loom after restart, thereby indentifying the yarn that broke.

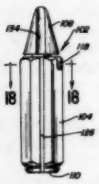
4,421,145

DEVICE FOR FORMING EYES AND LOOPS IN WIRE

Dewey O. Broberg, Jr., Long Grove, Ill., assignor to Du-Bro Products, Inc., Wauconda, Ill.

Filed Apr. 26, 1982, Ser. No. 371,679
Int. Cl.³ B21F *1/06*
U.S. Cl. 140—104 **30 Claims**





20. A device for forming an eyelet in wire, comprising:

a body;

first means on said body for forming a loop in a length of wire and twisting the wire helically away from the loop in response to relative rotation between the loop and the body; and

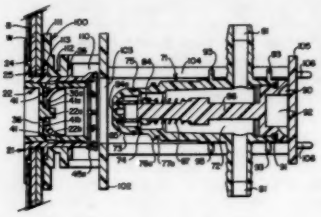
second means on said body for tightly wrapping a free end portion of the wire about a straight portion of the wire inwardly of the innermost twist to completely form said eyelet.

4,421,146

QUICK-DISCONNECT SERVICE-LINE CONNECTOR AND VALVE ASSEMBLY

Curtis J. Bond, Marion, and John G. Ulm, Upper Sandusky, both of Ohio, assignors to Liqui-Box Corporation, Worthington, Ohio

Continuation-in-part of Ser. No. 319,580, Nov. 9, 1981. This application Mar. 8, 1982, Ser. No. 355,530
Int. Cl.³ B65B *3/04*; B67C *5/37*
U.S. Cl. 141—349 **22 Claims**



1. A service-line connector for connecting the service-line of a fluid dispensing system to a spout on a container or the like comprising means for removably mounting it on the spout, said connector including a nozzle body having a fluid passageway therethrough with a service-line connection and an inlet leading thereinto, a normally-closed valve for controlling flow into and out of said inlet, guide means extending from said mounting means for supporting the body for axial movement to insert it into and withdraw it from the spout and means for positively opening said valve as the nozzle body is inserted into the spout, said mounting means being of yoke form and being adapted to slip transversely onto the spout to interfit therewith to prevent axial movement of the mounting means relative to the spout in either direction during insertion of the nozzle body into or withdrawal of it from the spout.

4,421,147

APPARATUS FOR DISPENSING GRANULAR MATERIAL

Samuel M. Cannella, Pine Brook, N.J., assignor to E-Z Way Products, Inc., Paterson, N.J.

Filed Oct. 19, 1981, Ser. No. 312,692
Int. Cl.³ B65B *1/04*
U.S. Cl. 141—362 **2 Claims**

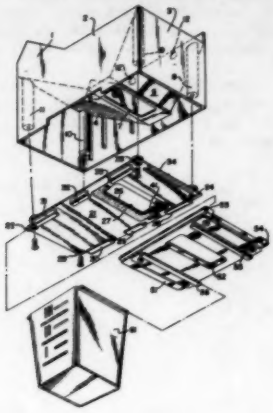
1. An apparatus for dispensing granular material from a storage box container, comprising:

(a) a housing having side walls and a receiving base, the receiving base having a dispensing opening therein, said side walls and receiving base being positioned so as to retain a storage box container at an adequate angle to permit gravity flow of granular material;

(b) a main rail connected to the underside of said housing, said main rail having sliding means capable of receiving a main slide so as to permit forward and reverse movement of said main slide with said main rail, said main rail also having an opening therein coinciding with said dispensing opening of said housing;

(c) a main slide, slidably connected to said sliding means of said main rail so as to permit its forward and reverse movement, said main slide having a main slide opening therein located so as to be coinciding with said dispensing opening of said housing when said main slide is in a first position and so as to be fully non-coincidental with said dispensing opening when said main slide is in a second position, and located so as to permit the flow of granular material out of said apparatus by gravity flow of granular material when located in said second position, said main slide also having means for attaching a receiving device under said main slide opening so that the receiving device

may be removably attached thereto and may receive granular material flowing out of said apparatus; and,



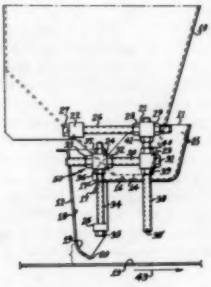
(d) a receiving device capable of attachment to said main slide.

4,421,148

DEVICE FOR FEEDING PARTICULATE MATERIAL

Frank S. Knoll, Jacksonville, and Arnold H. Jackson, Orange Park, both of Fla., assignors to Carpco, Inc., Jacksonville, Fla.

Filed Oct. 29, 1981, Ser. No. 316,138
Int. Cl.³ B65B *1/30*
U.S. Cl. 141—392 **25 Claims**



1. In a device for feeding a thin evenly distributed layer of particulate material to a moving surface comprising

(a) a hopper for containing particulate material and having an outlet in the bottom for discharging the particulate material;

(b) a cup-shaped pan encircling and spaced downwardly from said outlet, and having a spillway on one side thereof;

(c) a generally vertical chute means in communication with said pan and adapted to receive material from the spillway, permit the material to fall vertically to gain linear speed, and discharge such material in a generally horizontal direction in the same direction as said moving surface from the bottom of said chute means; and

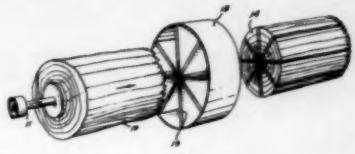
(d) connection means for adjustably attaching said chute means with respect to said spillway and with respect to said moving surface passing underneath and adjacent to the bottom of said chute means to vary the velocity of said particulate material being discharged and the location of the bottom of said chute means with respect to said moving surface.

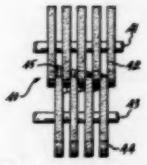
4,421,149

PROCESS FOR PREPARATION OF LONG WOOD STRANDS

Derek Barnes, Vancouver; Mark T. Churchland, Burnaby; Arnold W. Heradier, Burnaby, and James K. Welsh, Burnaby, all of Canada, assignors to MacMillan Bloedel Limited, Vancouver, Canada

Continuation-in-part of Ser. No. 885,985, Mar. 13, 1978, abandoned. This application Oct. 21, 1980, Ser. No. 199,191
Int. Cl.³ B27L *7/00*
U.S. Cl. 144—366 **4 Claims**





1. The method of splitting a log into longitudinal grain wood strands comprising the steps of, radially splitting the log substantially along the grain of the log into a plurality of sector shaped segments, said radial splitting including pushing the log axially through at least one sector splitter ring, and further splitting the sector shaped segments substantially along the grain of the segments, said further splitting including feeding each of the sector shaped segments through two rolls of intermeshing counter rotating parallel discs, pulling each of the segments between the rows of discs and simultaneously splitting each of the segments into a plurality of discrete longitudinal-grain wood strands whose surfaces generally follow the grain in the wood throughout their length.

4,421,150

WATERPROOF BAG DEVICE FOR ARTICLES

William E. Masters, 138 Norris Ave., Liberty, S.C. 29657

Filed Jul. 13, 1981, Ser. No. 282,454
Int. Cl.³ B65D *30/08, 33/16*
U.S. Cl. 383—61 **7 Claims**

7. A bag device for containing articles in a generally airtight waterproof environment comprising:

a flexible outer case having an inner enclosure;

said inner enclosure being constructed of an impervious material providing an airtight waterproof environment therein rendering said bag device buoyant;

closure means for sealing said inner enclosure;

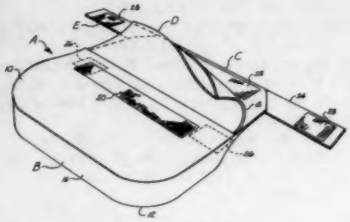
cover flap means carried by said outer case foldable over said closure means;

first fastening means fastening said cover flap and outer case together;

second fastening means securing said cover flap and outer cases; and

said first fastening means being yieldable to open upon suffi-

cient pressure exerted upon said bag to accommodate sudden impact while said second fastening means remains fastened to retain said closure means in said sealed configuration maintaining said airtight waterproof environment within said inner enclosure to preserve the buoyancy and waterproofness of said bag device.



4,421,151

TIRE-PRESSURE REGULATING SYSTEM

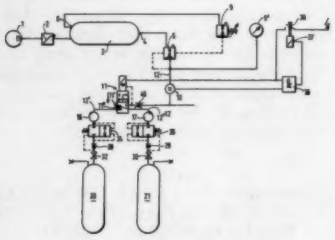
Werner Stumpe, Kornwestheim, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Mar. 4, 1982, Ser. No. 354,579

Claims priority, application Fed. Rep. of Germany, Mar. 5, 1981, 3108247

Int. Cl.³ B60C *23/10*

U.S. Cl. 152—417 **6 Claims**



1. A tire-pressure regulating system for varying the pressure in vehicle tires while driving, said system includes a compressed-air supply device which is connected with said vehicle tires via a supply line, said system further including rotor connections, control valves, flow restrictive means and an adjustable regulating valve, as well as a shut-off valve and an axle valve being disposed downstream of said regulating valve, characterized in that said axle valve is connected to said supply line on an inlet side and to a pair of branch supply lines on its outlet side, said axle valve having two switching positions, and further wherein in one switching position of said axle valve said pair of branch lines are connectable to the supply line leading back to a relay valve and in the other switching position the branch lines are connectable to a relief means.

4,421,152

APPARATUS FOR PRECISION CASTING

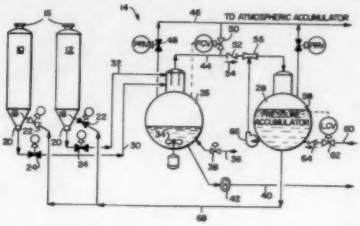
Tsutomu Shinkawa, Itami; Akihide Yoshino, Osaka; Hitoshi Konishi, Ibaragi; Yoshiaki Komuro, Nishinomiya; Satoshi Hamada, Suita, and Saburo Okumura, Amagasaki, all of Japan, assignors to Sansha Electric Mfg. Co., Ltd., Osaka, Japan

Filed Mar. 2, 1981, Ser. No. 239,470

Claims priority, application Japan, Mar. 5, 1980, 55-28270

Int. Cl.³ B22D *18/06, 21/02, 27/13*

U.S. Cl. 164—258 **5 Claims**



1. A casting device comprising a frame including spaced top and bottom walls and at least one open side, a melting chamber including a crucible within said frame and spaced from the top wall thereof, heating means for heating said crucible to melt the contents therein and means for discharging melted contents from the bottom of said crucible, a casting section containing a mold disposed beneath said melting chamber, supporting means carried by said frame for supportingg said melting chamber and casting section for individual vertical movement within said frame, fluid actuated means operable between said bottom wall and said casting section to move said mold upwardly and into contact with said melting chamber and in turn move said melting chamber upwardly into contact with the top wall of said frame prior to operation of said heating means and means in said top wall for feeding a gas to said melting chamber during operation of said heating means, said open side providing ready access to said melting chamber and casting section for individual removal from said frame, said casting section including a cup-shaped cylinder block mounted for vertical displacement, a casting chamber carrying said mold disposed within said cylinder block and movable vertically relative thereto and said fluid actuated means includes a fluid inlet port in said cylinder block and beneath said casting section whereby the introduction of a fluid into said port in said cylinder block forces the casting chamber upwardly against the melting chamber, the melting chamber uppwardly against said top wall and said cylinder block downwardly against said bottom wall.

4,421,153

METHOD OF MAKING AN AEROFOIL MEMBER FOR A GAS TURBINE ENGINE

Wilfred H. Wilkinson, Turnditch; Edwin Pateman, Allestree; Anthony G. Gale, Wollaton, and John Slinger, Spondon, all of England, assignors to Rolls-Royce Limited, London, England

Division of Ser. No. 62,419, Jul. 31, 1979, Pat. No. 4,321,010.

This application Jul. 13, 1981, Ser. No. 283,002

Claims priority, application United Kingdom, Aug. 17, 1978, 33660/78

Int. Cl.³ B22C *9/04, 9/00*

U.S. Cl. 164—35 **2 Claims**

1. A method of making a blade or vane structure for a gas turbine engine, the blade or vane structure including a hollow aerofoil member having an inner end and an outer end and a cooling air entry tube positioned therein, the cooling air entry tube having an inner end and an outer end and extending integrally from the inner end of the hollow aerofoil member

toward the outer end of the hollow aerofoil member in a cantilevered relationship and spaced entirely from an interior surface of the hollow aerofoil member, said method comprising the steps of:

injection molding a disposable tube piece;

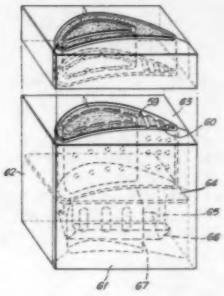
mounting said disposable tube piece in a die;

injection molding ceramic in a fluid state into said die to fill the interior of said disposable tube piece;

causing said ceramic to harden;

removing said ceramic with the disposable tube piece embedded therein from said die;

mounting said ceramic with said disposable tube piece embedded therein in a further die having a desired shape of a ceramic core;



injecting more of said ceramic in a fluid state to fill the space between the outside of said disposable tube piece and said die;

causing said more of said ceramic to harden;

removing said ceramic core with the disposable piece embedded therein from said die;

removing said disposable piece from said ceramic core;

placing said ceramic core in a further die and injecting wax into all voids in the ceramic core and around the ceramic core to make a wax preform;

forming a shell mold about the wax preform;

removing the wax preform from the shell mold by melting; and

then casting metal into said shell mold to make the aerofoil member and the cooling air entry tube.

4,421,154

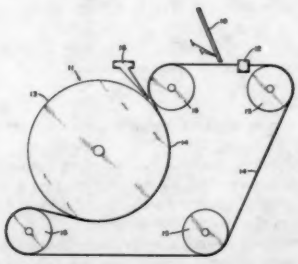
FAIL SAFE AIR WIPE

Michael C. Smith, LaGrange, Ga., assignor to Southwire Company, Carrollton, Ga.

Filed Dec. 14, 1981, Ser. No. 330,115

Int. Cl.³ B22D *11/06*

U.S. Cl. 164—158 **13 Claims**



1. A fail safe air wipe for use in a casting band cleaning system of a band type continuous casting system for thoroughly removing cleanser and rinsing agent from the band comprising:

(a) pneumatic wiping means situated near the casting band and between the position where cleanser and rinsing agent is applied and the position where molten metal is poured into a continuously formed mold; and

(b) mechanical wiping means connected to said pneumatic wiping means downstream of and in tandem relationship with said pneumatic wiping means;

an activator means is provided for activating said mechanical wiping means by insufficient pressure of said pneumatic wiping means.

4,421,155

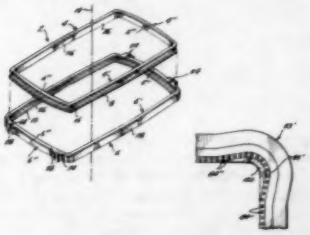
MACHINE DUPLICATABLE, DIRECT CHILL FLAT INGOT CASTING MOLD WITH CONTROLLED CORNER WATER AND ADJUSTABLE CROWN FORMING CAPABILITY

Frank E. Wagstaff, Spokane, Wash., assignor to Wagstaff Engineering, Incorporated, Spokane, Wash.

Filed Aug. 25, 1977, Ser. No. 827,587

Int. Cl.³ B22D *11/124*

U.S. Cl. 164—444 **6 Claims**



1. A flat ingot casting mold having a mold-cavity defining member at the inner periphery thereof which comprises a generally rectangularly shaped band that is monolithically continuous about the circumference thereof, including at the corners of the cavity, and inherently convexly bowed on the relatively longer and shorter sides thereof so that it forms crowns on the opposing side walls of the ingot operatively formed in the cavity, the bow in the relatively longer sides of the band having an inherent deflection adapted to form a crown intermediate between that adapted to compensate for shrinkage during the butt forming stage of the casting operation and that adapted to compensate for shrinkage when the casting operation is conducted at operating speed, but the relatively longer sides of the band being adapted to flex laterally inwardly and outwardly thereof and there being drive means connected with the relatively longer sides of the band to flex the same, firstly relatively laterally inwardly thereof to alter the deflection to that adapted to compensate for shrinkage during the butt forming stage, and thence relatively laterally outwardly thereof to alter the deflection to that adapted to compensate for shrinkage when the casting operation is conducted at operating speed, and there also being coolant delivery apertures in one axial end of the band adjacent the inner peripheral face thereof, which are spaced apart from one another about the circumference of the mold and offset from the inner peripheral facial plane of the band at a greater distance in the corner portions of the same than along the relatively longer and shorter sides thereof, to discharge the coolant so that it impinges on the ingot at points more distant from the one axial end of the band at the corners of the mold, than it impinges on the ingot along the relatively longer and shorter sides of the mold.

4,421,156

PROCESS FOR THE OPTIMIZED HEAT TRANSFER FROM CARRIERS OF REVERSIBLE, HETEROGENEOUS EVAPORATION PROCESSES FOR THE PURPOSE OF GENERATING HEAT OR COLD AND APPARATUS FOR CARRYING OUT THE PROCESS

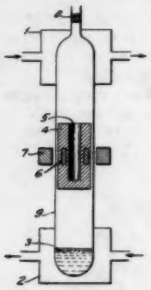
Gert Vaubel, Paderborn-Schloss Neuhaus; Rolf Rathert, Bielefeld, and Alfred Ritter, Mulheim, all of Fed. Rep. of Germany, assignors to Studiengesellschaft Kohle mbH, Mulheim, Fed. Rep. of Germany

Filed Dec. 11, 1981, Ser. No. 329,797

Claims priority, application Fed. Rep. of Germany, Dec. 17, 1980, 3047632

Int. Cl.³ F28D *21/00*

U.S. Cl. 165—1 14 Claims



1. In a process for the heat transfer from carriers of reversible, heterogeneous evaporation processes for the purpose of generating heat or cold by means of the principle of the heat pipe, the improvement comprising optimizing the heat transfer by arranging the carrier of the reversible, heterogeneous evaporation process in the interior of a heat pipe.

10. A heat transfer apparatus comprising a vertical heat pipe, a heat source connected to the bottom of the heat pipe a heat sink connected to the top of heat pipe and a low-boiling liquid and a carrier of a reversible, heterogeneous evaporation process in the heat pipe and a feed line and discharge line for the gas of the reversible heterogeneous evaporation process.

4,421,157

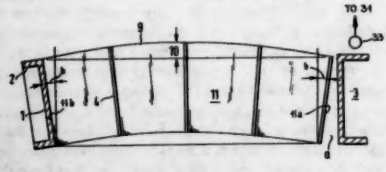
STATOR SECTOR PLATE FOR REGENERATIVE AIR PREHEATER

Herbert Sandmann, Olpe, Fed. Rep. of Germany, assignor to Apparatebau Rothemühle Brandt & Kritzler GmbH, Wenden, Fed. Rep. of Germany

Filed Aug. 17, 1982, Ser. No. 408,729

Int. Cl.³ F28D *17/00*

U.S. Cl. 165—4 12 Claims



1. A sector plate for a regenerative air preheater, the plate comprising:

an outer support ring centered on an axis and normally of cylindrical shape;

an inner support ring centered on the axis;

a plurality of radially extending walls lying generally in axial planes and having outer ends fixed to the outer ring and inner ends and guided on the inner ring;

a plurality of angularly extending and radially spaced annular walls extending between the radial walls and forming therewith axially throughgoing passages, whereby when hot gases flow in one axial direction through the passages they thermally deform the radial walls so that their ends move into a position at an angle to each other; and

means for thermally deforming the outer ring to a taper equal to twice the angle for holding the inner ends of the radial walls and the inner ring in the axially level with the outer ring when hot gases flow through the passages.

4,421,158

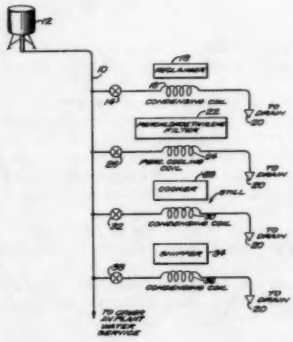
COOLANT RECIRCULATION SYSTEM FOR DRY CLEANING PLANTS

Robert D. Kirchner, 1816 Remson Ave., Merrick, N.Y. 11566

Filed May 14, 1981, Ser. No. 263,798

Int. Cl.³ B60H *1/00*; B61D *27/00*; F28F *27/00*

U.S. Cl. 165—40 14 Claims



1. A system for use in a dry cleaning facility comprising:

apparatus for reclaiming and cooling dry cleaning fluids of the kind having condensing coils and cooling coils, respectively;

means for connecting each of said coils of the apparatus in series to form a coolant loop;

pump means connected to provide fluid circulation in said coolant loop;

means for making a fluid connection from a pressurized source of water to said coolant loop;

thermally operable valve means connected in said coolant loop; and

means connecting said thermally operable valve means to a fluid waste line;

said thermally operable valve including temperature sensing means arranged in said coolant loop for controlling the operation of said thermally operable valve upon exceeding a predetermined temperature,

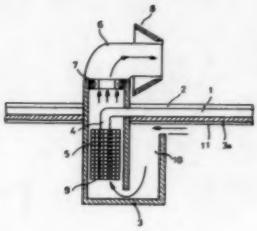
whereby upon sensing a temperature above the preselected temperature the thermally operable valve is operated to cause the water in the coolant loop to enter the fluid waste line, thereby permitting pressurized water to enter the loop from the source of the water.

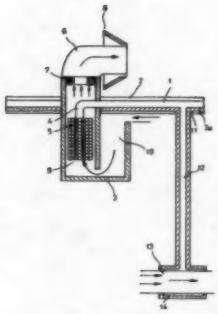
4,421,159

HEAT-DISSIPATING DEVICE OPERATED BY SOLAR ENERGY

Shao C. Lin, 47-3, Section 2, Keelung Rd., Taipei, Taiwan

Filed Feb. 2, 1982, Ser. No. 345,065
Int. Cl.³ B60H 3/00
U.S. Cl. 165—44 **8 Claims**





1. A cooling device installed on the top of an enclosure said device comprising: a heat-collecting metallic plate overlaying the top of said enclosure, a transparent panel superimposed over said metallic plate, an inslating layer lying beneath said metallic plate, an air path having an inlet at the interior of said enclosure and a rotatable outlet, heat-radiating means located in said air path and a metallic rod interconnecting said metallic plate and said heat-radiating means, said air path being such that cool air entering through said inlet is heated by said heat-radiating means and exhausted through said rotatable outlet, wherein said rotatable outlet is elbow shaped and has an end vertically and rotatably mounted and an other end horizontally oriented.

4,421,160

SHELL AND TUBE HEAT EXCHANGER WITH REMOVABLE TUBES AND TUBE SHEETS

Donald C. Stafford, Hinsdale, and Vincent F. Allo, Warrenville, both of Ill., assignors to Chicago Bridge & Iron Company, Oak Brook, Ill.

Filed Oct. 16, 1980, Ser. No. 197,482
Int. Cl.³ F28F 9/06
U.S. Cl. 165—76 **11 Claims**

1. A heat exchanger comprising:

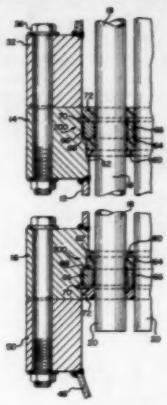
a plurality of spaced apart tubes loosely penetrating aligned oversized holes in two spaced apart metal tube sheets;

a shell around the tube sheets;

each tube sheet being secured against inward displacement axial to the tubes by contact with stop means on the shell;

each tube sheet being barred against outward displacement axial to the tubes by releasable restraining means mechanically engaging the tube sheet and shell so that upon release of the restraining means it no longer bars removal of the tube sheet from the shell;

a polymeric solid binder covering the tube sheet outer surface and the restraining means and joining and sealing the tubes to the tube sheet and joining and sealing the tube sheet to the shell, with said solid binder having substantial compressive, tensile and shear strength, and being convertible by heat at a sufficiently high temperature to a physical state in which it has much lower compressive, tensile and shear strength;



means to deliver a heat exchange fluid around the tubes inside of the shell between the tube sheets; and

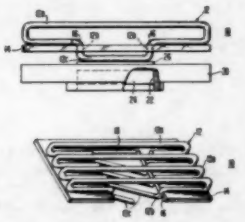
means to deliver a liquid feed stream into a feed box partially defined by one of the tube sheets.

4,421,161

HEAT EXCHANGER FOR INTEGRATED CIRCUIT PACKAGES

Samuel R. Romania, Phoenixville, and Grant M. Smith, Bryn Athyn, both of Pa., assignors to Burroughs Corporation, Detroit, Mich.

Filed May 6, 1982, Ser. No. 375,491
Int. Cl.³ F28F 7/00
U.S. Cl. 165—80 C **9 Claims**



1. A heat exchange device for an integrated circuit package comprising:

a wire form having a plurality of spaced-apart turns, each of said turns exhibiting an open T-shaped configuration wherein an upper turn portion of predetermined length is joined by a pair of opposed legs to a comparatively shorter length lower turn portion,

a retainer plate configured as a frame-like member with a central opening,

said wire form being disposed within said central opening such that the upper and lower turn portions of said turns

extend outward from the respective opposite planar surfaces of said retainer plate, the legs of each of said turns contacting the edges of said retainer plate adjacent said central opening,

said wire form being affixed to said retainer plate to produce an integral unit.

4,421,162

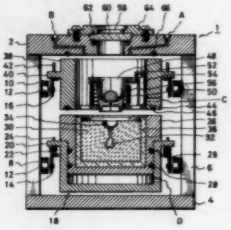
FLAT PLATE HEAT EXCHANGE APPARATUS

James E. Tollar, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jun. 25, 1982, Ser. No. 392,397

Int. Cl.³ F28D *1/00*; F28F *9/22*

U.S. Cl. 165—140 **10 Claims**



1. A heat exchange vessel, the vessel having an axis extending from a first end to a second end, a foraminous feed tube disposed generally coaxially with the axis of the vessel at least adjacent the first end, a first annular flat plate heat exchanger disposed coaxially about the foraminous tube; at least a second flat plate heat exchanger disposed externally to the first flat plate heat exchanger and generally coaxial therewith; means to supply a first heat exchange fluid to the first flat plate heat exchanger; means to supply a second heat exchange fluid to the second flat plate heat exchanger, the first and second flat plate heat exchangers being disposed within the vessel, the vessel having a product discharge port at the second end of the vessel with the further limitation that each of the flat plate heat exchangers comprise a plurality of generally annular flat plates, each having a centrally disposed aperture, the plate like members assembled perpendicularly to the axis of the vessel with a space between each of the individual plate members; the plate members being positioned in close proximity to one another to provide a flow pattern between adjacent members, the plate members being in spaced apart relationship; a plurality of heat exchange conduits passing through said plate like members to thereby permit circulation of heat exchange fluid through said conduits.

4,421,163

DOWNHOLE STEAM GENERATOR AND TURBOPUMP

Gary E. Tuttle, Canoga Park, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jul. 13, 1981, Ser. No. 282,487

Int. Cl.³ E21B *43/24*

U.S. Cl. 166—59 **2 Claims**

1. An oil recovery system comprising:

as borehole leading downward from a wellhead;

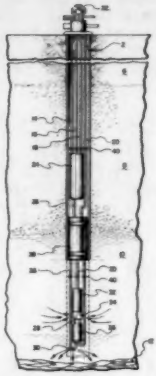
a fuel-burning steam generator for generating steam at a desired downhole location within said borehole;

an oil pump mounted adjacent said generator, said pump serving to draw oil and to deliver the oil through an oil conduit to said wellhead;

a steam turbine mounted adjacent said generator and operable to drive said pump;

means for delivering steam from said generator into the formations adjacent said borehole;

diverter valve means operable to supply at least a portion of the steam from said generator to operate said turbine; and



packer means for sealing said borehole above said delivering means and for securing the components of said system at a desired location in said borehole.

4,421,164

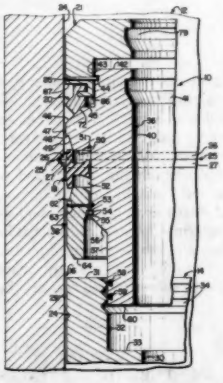
WEIGHT-SET PACK-OFF UNIT

Edward M. Galle, Jr., Houston, Tex., assignor to Armco Inc., Middletown, Ohio

Filed Oct. 29, 1981, Ser. No. 316,395

Int. Cl.³ F21B *23/00*; F16L *35/00*

U.S. Cl. 166—118 **13 Claims**



1. A weight-set pack-off unit for sealing the annulus between an inner pipe received in an outer pipe, the combination comprising:

an inwardly facing groove in the outer pipe;

an upwardly facing shoulder on the inner pipe;

a pack-off body having an annular weight-set packing received thereon and an annular actuating member coupled to said pack-off body below said weight-set packing for upward slidable movement into engagement with said weight-set packing upon landing of said actuating member on said upwardly facing shoulder on the inner pipe as a result of downward movement of said pack-off body longitudinally of the outer pipe;

expandable annular locking means, receivable in said groove in the outer pipe, for locking said pack-off body to the

outer pipe and preventing upward movement of the pack-off unit relative to the outer pipe; and

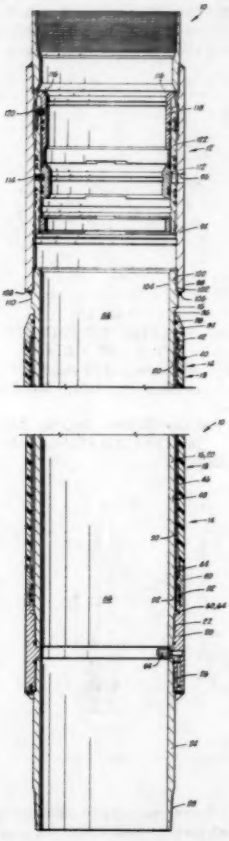
a ring, coupled to said pack-off body above said weight-set packing, for supporting said locking means above said weight-set packing and for moving said locking means into and out of said groove in the outer pipe by downward and upward movement, respectively, of said ring longitudinally of the outer pipe.

4,421,165

MULTIPLE STAGE CEMENTER AND CASING INFLATION PACKER

David D. Szarka, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed Jul. 15, 1980, Ser. No. 169,095
Int. Cl.³ F21B *33/13*
U.S. Cl. 166—151 1 Claim



1. A well tool for use in stage cementing a well bore, comprising:

a substantially tubular cementing tool operated by an opening and a closing cementing plug, including a cylindrical outer casing, cementing ports disposed through the side wall of said casing, an upper adapter of lesser external diameter than said casing and permanently secured thereto, an annular opening sleeve disposed adjacent said ports in said casing and secured in place by shear means, an annular closing sleeve above said opening sleeve and concentric therewith, an intermediate sleeve surrounding said opening sleeve and said closing sleeve and secured to said closing sleeve by shear means, said intermediate sleeve having substantially the same internal diameter as said upper adapter, said casing and said sleeves defining an open bore through said cementing tool;

a substantially tubular packer mandrel of lesser external diameter than said casing and permanently secured thereto, said packer mandrel having substantially the same internal diameter as said upper adapter;

an inflatable packing element disposed about said packer mandrel, said packing element including an annular sliding shoe at the upper end of said packer mandrel, an annular fixed shoe at the lower end of said packer mandrel, a tubular solid wall metal bladder membrane secured to said shoes and disposed therebetween about said packer mandrel, and an elastomeric bladder disposed around said membrane and extending between said shoes;

a valve body containing a packer inflation valve in the wall thereof and secured to the lower end of said packer mandrel, said valve body being of substantially the same external diameter as said fixed shoe to which it is secured, and of substantially the same internal diameter as said mandrel;

a lower adapter of substantially the same internal diameter as said packer mandrel and of lesser external diameter than said casing, secured to said valve body and concentric therewith; and

knockout plug means blocking an inflation passage leading to said inflation valve, and adapted to break off from said valve body and fall to a level in the well bore below said well tool;

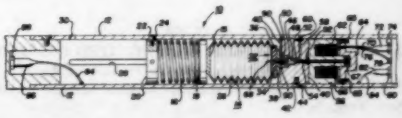
said inflatable packing element having a maximum external diameter in an uninflated state no greater than that of said casing, and said upper adapter, said intermediate sleeve, said mandrel, said valve body and said lower adapter defining a substantially constant diameter bore through said well tool, whereby an unobstructed bore of said substantially constant diameter may be obtained through the entirety of said well tool after a cementing operation by the drilling out of said opening sleeve, said closing sleeve and said plugs.

4,421,166

APPARATUS FOR INJECTING MATERIAL INTO A WELL-BORE

Robert W. Cain, 1812 Avondale, Colleyville, Tex. 76034

Filed May 18, 1981, Ser. No. 264,575
Int. Cl.³ E21B *27/00*
U.S. Cl. 166—162 38 Claims



1. An injector apparatus comprising:

a sealed self contained, replaceable vessel containing a predetermined amount of ejectable material;

a motive force means operatively positioned with respect to said vessel and to pressurize the material within said vessel;

a first exit means operatively positioned with respect to said vessel and capable of providing a passageway from said vessel through which said ejectable material is capable of flowing and being ejected therefrom;

a valve means operatively positioned with respect to said vessel and capable of controlling the flow of material from said vessel through said first exit means; and

actuator means operatively positioned to control the opera-

tion of said valve means, said actuator means comprising a solenoid means operatively positioned with respect to said valve means whereby a valve in said valve means is caused to be positioned away from a valve seat such that the ejectable material can flow through an exit opening formed in said valve seat when said solenoid is actuated.

4,421,167

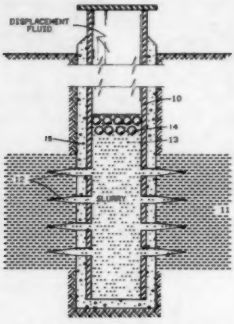
METHOD OF CONTROLLING DISPLACEMENT OF PROPPING AGENT IN FRACTURING TREATMENTS

Steven R. Erbstoesser, Missouri City, and Robert L. Graham, Houston, both of Tex., assignors to Exxon Production Research Co., Houston, Tex.

Continuation of Ser. No. 204,103, Nov. 5, 1980, abandoned. This application Aug. 30, 1982, Ser. No. 412,671

Int. Cl.³ E21B *33/13, 43/267, 47/06*

U.S. Cl. 166—255 **6 Claims**



1. A method for preventing the over-displacement of propping agent in a hydraulically-induced fracture in a subterranean formation surrounding a well casing having a perforated interval therein, which comprises incorporating ball sealers in the trailing portion of a slurry of propping agent particles and fracturing fluid being injected down the well and into the formation; displacing the fracturing fluid having the ball sealers suspended therein to the perforated interval with a displacing fluid having a density equal to or less than the fracturing fluid, said ball sealers having a density greater than that of the displacing fluid but sufficiently low to prevent settling in the slurry; monitoring the surface pumping pressure during pumping of the displacing fluid; and, terminating said displacement of the fracturing fluid in response to detection of an increase in the surface pumping pressure.

4,421,168

SURFACTANT WATERFLOODING WITH GRADED SALINITY DRIVE FOR OIL RECOVERY

Billy G. Hurd, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 10, 1980, Ser. No. 205,354

Int. Cl.³ E21B *43/22*

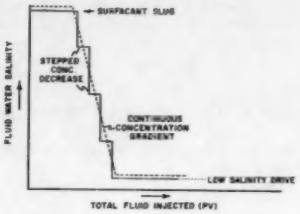
U.S. Cl. 166—273 **21 Claims**

1. In a method of recovering oil from a subterranean formation containing oil and having at least one injection well and at least one production well, the improvement comprising the steps of:

(a) injecting through an injection well and into said subterranean formation an aqueous saline surfactant solution having sufficient surfactant to effect an interfacial tension between said aqueous saline surfactant solution and said oil of less than about 0.1 dyne per centimeter;

(b) injecting through said injection well subsequent to said aqueous saline surfactant solution an aqueous brine drive fluid;

(c) gradually decreasing salt concentration of the drive fluid at a rate sufficient to prevent excessive pressure drop in the formation, wherein the drive fluid salt concentration is decreased incrementally by a plurality of steps between a



high concentration and a low concentration, and wherein each incremental decrease is a differential amount less than about one-third of the initial salt concentration; and

(d) recovering oil from a production well.

4,421,169

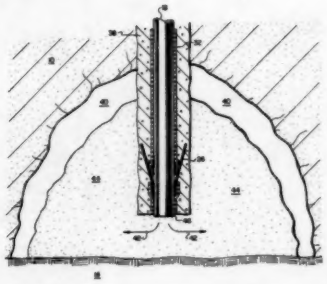
PROTECTIVE SHEATH FOR HIGH TEMPERATURE PROCESS WELLS

James D. Dearth, Houston, and Herbert B. Wolcott, Jr., Plano, both of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Dec. 3, 1981, Ser. No. 326,984

Int. Cl.³ F21B *33/14, 36/00*

U.S. Cl. 166—285 **10 Claims**



9. A method for supporting and maintaining the integrity of a cement sheath formed in-situ between a casing and a borehole wall in a hot subterranean zone:

slidably positioning a cement hanger on said casing, said hanger including a plurality of cement engaging arms extending outwardly from said casing for engaging said sheath;

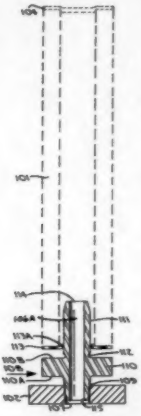
limiting the axial motion of said hanger along said casing; and

wrapping all exterior surfaces of said casing and said hanger, except said cement engaging arms, with a layer of compressible refractory insulation.

4,421,170
METHOD AND APPARATUS FOR QUICK REPLACEMENT OF CARTRIDGE FILTERS USED IN WELL FLUID CLEANING OPERATIONS

Edward R. Swift, Jr., Houston, and Philip W. Schmuck, Spring, both of Tex., assignors to Baker International Corporation, Orange, Calif.

Continuation of Ser. No. 118,958, Feb. 6, 1980, Pat. No. 4,295,525. This application Oct. 2, 1981, Ser. No. 307,974
The portion of the term of this patent subsequent to Oct. 20, 1998, has been disclaimed.
Int. Cl.³ B01D *27/00, 27/08, 29/10*; E21B *43/00*
U.S. Cl. 166—312 **9 Claims**



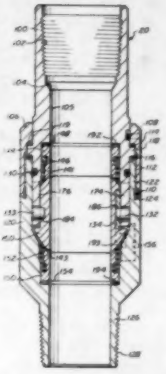
1. In an apparatus for treating and removing contaminate particulate matter from fluid circulatable into, through and out of a subterranean well, the improvement comprising: a cylindrical housing adapted to receive and discharge said fluid; means disposed across said cylindrical housing for separating said cylindrical housing into a first fluid chamber for receiving fluid to be filtered and a second fluid chamber for receiving filtered fluid; at least one cartridge filter adapter receiving means disposed through said separating means; a cartridge filter adapter secured within each of said receiving means, said adapter having an elongated cylindrical housing, and having a fluid flow passageway therethrough communicable to each of said first and second fluid chambers, said elongated cylindrical housing having an enlarged cartridge positioning portion extending radially away from and about an axis of said elongated cylindrical housing; groove means on said adapter circumferentially extending around the exterior of said elongated cylindrical housing for sealingly securing one end of said cartridge filter thereon; cartridge filter means positionable on said adapter and extending within said first fluid chamber; and seal means disposed at one end of said cartridge filter and having an interiorly facing circumferentially extending flexible lip for contact with the exterior of said elongated cylindrical housing upon location of said cartridge filter on said adapter, said lip being sealingly securable within said groove.

4,421,171
VALVE OPERABLE UNDER OPPOSITELY DIRECTED PRESSURE DIFFERENTIALS

Andrew Haynes, Missouri City, Tex., assignor to Baker International Corporation, Orange, Calif.

Filed May 21, 1981, Ser. No. 265,866
Int. Cl.³ E21B *34/12*
U.S. Cl. 166—331 **17 Claims**

1. A valve apparatus for use in a subterranean well and carriable on a fluid transmission conduit insertable therein, said valve apparatus being responsive to axial rotational manipulation of said fluid transmission conduit; said valve apparatus having first and second mutually rotatable housing members having axially aligned bores; ball valve head means mounted on said first housing member and having a cylindrical flow passage extending therethrough; pivot means for mounting said ball valve head means on said first housing member with said ball valve head means being free to rotate with respect to said first housing member; and lever means mounted on said

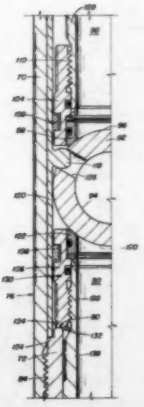


pivot means with said pivot means comprising the fulcrum for said lever means, said lever means having first and second ends axially spaced apart, said first end engaging said ball valve head means immediate said first housing member on one side of said pivot means, said second end of said lever means engaging said second housing member on the other side of said pivot means immediate said second housing; rotation being transferred to said ball valve head means during rotation of said first and second housing members.

4,421,172
DRILL PIPE TESTER AND SAFETY VALVE

Michael E. McMahan, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed Jul. 13, 1981, Ser. No. 282,979
Int. Cl.³ E21B *34/08*
U.S. Cl. 166—334 **3 Claims**



1. A pipe tester valve comprising:

a housing having a first end adapted to be connected to a string of pipe, having a flow passage therethrough and having longitudinal channel means disposed about a portion of the interior thereof;

a spherical valve member disposed in said flow passage of said housing;

lug means, attached to said housing, for engaging said spherical valve member and rotating said spherical valve member between open and closed positions wherein said flow passage is open and closed, respectively, as said spherical valve member is moved axially relative to said housing and said lug means;

moving means for moving said spherical valve member axially relative to said housing between the open and the closed positions, said moving means including:

lower valve member seat means having a downward facing surface supportably engaged by an upward facing surface of said housing when said spherical valve member is in its closed position, so that downward forces exerted on said spherical valve member in the closed position due to fluid pressure in said string of pipe above said spherical valve member are transmitted to said housing through the engagement of said downward facing surface and said upward facing surface;

upper moving mandrel portion attached to said lower valve member seat means;

lower moving mandrel portion having an upper end adapted for engagement with a lower end of the upper moving mandrel portion and having spline means on a portion of the exterior thereof which slidingly engage the longitudinal channel means of said housing whereby when a predetermined amount of force is applied to said housing by a predetermined amount of weight of said string of pipe being set down on said housing said lower moving mandrel portion being moved upward relative to said housing and is engaged with said upper moving mandrel portion to move said upper moving mandrel portion upward relative to said housing thereby opening said spherical valve member;

latch means for latching said spherical valve member in the closed position, said latch means including first locking means for releasably locking said upper moving mandrel portion relative to said housing in a position holding said spherical valve member in the closed position; and

resilient means interposed between said housing abutting a portion thereof and said moving means abutting a portion thereof thereby preventing movement of said moving means with respect to said housing until a predetermined amount of force is applied by said string of pipe by setting a predetermined amount of weight of said string of pipe on said housing.

4,421,173

MOTION COMPENSATOR WITH IMPROVED POSITION INDICATOR

Bruce E. Beakley, Webster, and Douglas W. J. Nayler, Kingwood, both of Tex., assignors to NL Industries, Inc., New York, N.Y.

Filed Aug. 20, 1981, Ser. No. 294,436
Int. Cl.³ E21B *19/09, 7/12, 43/013*
U.S. Cl. 166—336 **13 Claims**

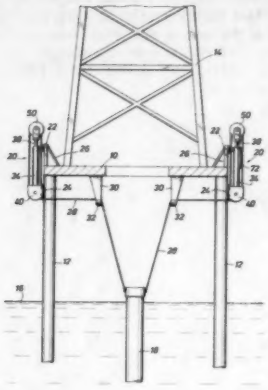
1. Motion compensation apparatus for disposition between an offshore support structure and an offshore well structure movable with respect to said support structure, comprising:

first and second compensator bodies interconnected with said support structure and said well structure such that relative movement between said structures causes relative movement between said compensator bodies, said bodies further being interconnected with each other for relative movement in generally vertical directional modes;

means associated with said compensator bodies for resiliently resisting relative movement therebetween in a first directional mode;

and position indicator means associated with said bodies comprising—

a flexible vessel having one end connected to said one of said compensator bodies and the other end connected to



the other of said compensator bodies generally below said one end, said vessel being filled with a liquid between said ends;

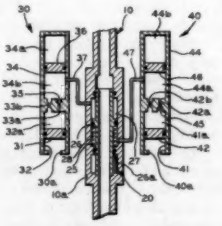
and pressure sensitive transmitter means associated with said other end of said vessel and operative to produce a signal which is a function of the hydraulic head at said other end of said vessel.

4,421,174

CYCLIC ANNULUS PRESSURE CONTROLLED OIL WELL FLOW VALVE AND METHOD

David M. McStravick, Houston, and Neil H. Akkerman, Kingwood, both of Tex., assignors to Baker International Corporation, Orange, Calif.

Filed Jul. 13, 1981, Ser. No. 282,639
Int. Cl.³ E21B *34/10*
U.S. Cl. 166—374 **11 Claims**



1. The method of operating a flow valve installed on a conduit string in a subterranean well and actuable by a piston that is shiftable between two positions and biased toward one of such positions, the conduit string being surrounded by a fluid annulus, comprising the steps of:

(1) producing cyclic variations in the pressure of said fluid annulus;

(2) deriving a pressure signal from said cyclic variations in the pressure of said fluid annulus, during cyclic variation of the pressure in said fluid annulus, and

(3) applying said pressure signal to said shiftable piston in a

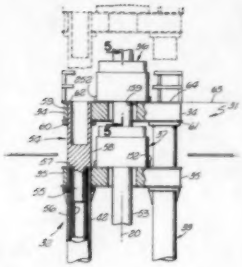
direction in opposition to the bias whereby said shiftable piston is maintained in one position while said cycling of the pressure of the fluid annulus exists and shifts to a second position whenever the effective fluid pressure cycling of the fluid annulus is terminated.

4,421,175

METHOD OF DRILLING AND CASING A WELL

George I. Boyadjieff, Anaheim, and Andrew B. Campbell, San Marino, both of Calif., assignors to Varco International, Inc., Orange, Calif.

Filed Aug. 28, 1981, Ser. No. 297,120
Int. Cl.³ E21B *19/10*
U.S. Cl. 166—383 **15 Claims**



1. The method of drilling and casing a well with a rig having a rig floor, which comprises:

positioning in the rig a plurality of vertically extending fluid pressure actuated units each including a piston section and a cylinder section with a first of said sections being actuable vertically relative to the second section by pressure fluid, and with said units projecting downwardly beneath the level of said rig floor;

drilling a well with a drill string extending downwardly through the rig floor and past said fluid pressure actuated units while said units remain in said positions of projection downwardly beneath the level of the rig floor to avoid interference with the drilling operation;

removing said drill string from the well after said drilling operation;

connecting to said first sections of said actuating units, after the drilling operation, an extension structure which is movable upwardly and downwardly with said first sections and projects upwardly above the level of the rig floor and carries a first casing supporting device above the level of the rig floor; and

then lowering a string of casing into the well by vertical reciprocation of said first sections of the fluid pressure actuated units and the connected extension structure and said first casing supporting device relative to a second casing supporting device, with the casing string being supported by said first device during downward movement thereof and by said second device during upward movement of the first device.

4,421,176

PORTABLE POWER OPERATED CULTIVATOR WITH AXIALLY ADJUSTABLE SHIELD

Lloyd H. Tuggle, Shreveport, and Ronald C. Loyd, Keithville, both of La., assignors to Emerson Electric Co., Shreveport, La.

Filed Nov. 24, 1980, Ser. No. 210,028
Int. Cl.³ A01B *33/02*
U.S. Cl. 172—41 **2 Claims**

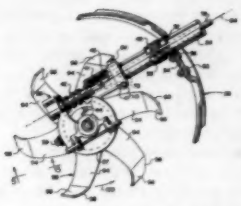
1. A portable power operated cultivator comprising:

a power unit including an internal combustion engine having a power takeoff shaft;

an elongated boom connected at one end to said power unit and including a drive shaft connected to said power takeoff shaft;

drive means disposed on said boom at the end opposite said one end, said drive means including an output shaft having oppositely projecting end portions, said output shaft being drivenly connected to said drive shaft and having an axis of rotation substantially perpendicular to the axis of rotation of said drive shaft;

rotary cultivator blade means drivably mounted on respective ones of said opposite end portions of said output shaft and on opposite sides of said axis of rotation of said drive shaft;



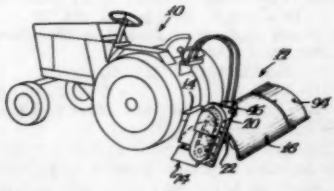
means for carrying said cultivator and manipulating said cultivator during the operation thereof including first handle means disposed at one end of said boom and mounted on said power unit and second handle means adjustably mounted on said boom between said first handle means and said drive means, and a shield mounted on said boom between said second handle means and said drive means, said shield comprising a plate secured to said boom for deflecting material impelled by said blade means toward said handle means, said shield being secured to said boom in such a way that said shield can be adjustably positioned axially along said boom but cannot be displaced about the axis of rotation of said output shaft to reduce the shielded area between said blade means and said handle means.

4,421,177

END DRIVE ROTARY CULTIVATOR

William J. Schlapman, Winneconne, and Roger T. Gault, Wild Rose, both of Wis., assignors to J. I. Case Company, Racine, Wis.

Filed Oct. 9, 1981, Ser. No. 310,080
Int. Cl.³ A01B *33/02, 33/16*
U.S. Cl. 172—63 **4 Claims**



1. A rotary cultivator adapted to be mounted on a tractor for soil cultivation, comprising:

a laterally extending housing,

a tine cultivation shaft rotatably supported by said housing,

drive means disposed at one end of said housing for rotating said cultivator shaft, and

ground-engaging means on said housing for urging the cultivator downwardly during forward movement thereof for enhancing soil cultivation by said cultivation shaft, comprising

a ground-engaging member mounted on said housing having a first leading edge portion extending angularly rearwardly of the direction of forward movement of the cultivator and including

a first ground engaging surface extending angularly inwardly and rearwardly of said leading edge portion and

a second ground-engaging surface extending rearwardly of said leading edge generally parallel to the direction of forward movement of said cultivator.

3. A rotary cultivator adapted to be mounted on a tractor for said cultivator, comprising:

a laterally extending cultivator housing,

a tined cultivation shaft rotatably supported by said housing,

drive means operatively connected with one end of said cultivation shaft for rotation thereof, and

a cultivation shaft extension adapted to be selectively connected to a portion of said cultivator shaft for rotation therewith for selectively extending the area of soil cultivation of said cultivator,

said cultivation shaft includes a stub shaft disposed in an outer shaft, said stub shaft being removable from said outer shaft and said shaft extension being insertable in said outer shaft in place of said stub shaft.

4,421,178

ROTARY CULTIVATOR HOEING TOOL FITTED WITH ONE OR MORE NON-COMPACTION TEETH

Dino Vandelli, Spilamberto; Ugo Fabriani, San Cesario sul Panaro, and Ambrogino Vandelli, Vignola, all of Italy, assignors to ASCO Di Vandelli Dino & C. S.N.C., Modena, Italy

Filed Aug. 25, 1981, Ser. No. 296,175

Claims priority, application Italy, Aug. 26, 1980, 40064 A/80; Jul. 23, 1981, 40079 A/81

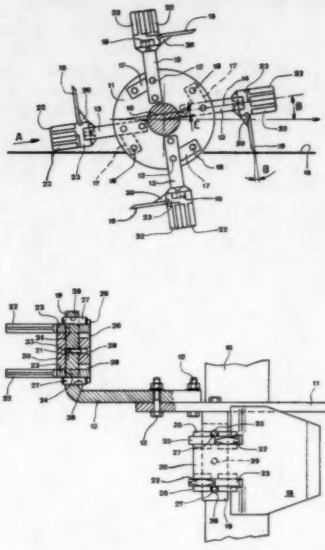
Int. Cl.³ A01B *9/00, 33/02, 33/10*

U.S. Cl. 172—548 **5 Claims**

1. A rotary cultivator hoeing tool affixed to a flange of a cultivator shaft, comprising:

(a) an L-shaped mounting member having a first arm affixed to the cultivator shaft flange to extend in a generally radial direction of the flange and a second arm attached to the first arm to extend transversely therefrom; and

(b) a hoe blade having at an upper central section thereof a shank attachable to the transverse second arm of said L-shaped mounting member, wherein said shank includes a transverse slot engageable with said transverse second arm, and means for securing the shank to the second arm, said means including a cap positioned to retain the second arm within the slot and a screw insertable to pass through an aperture formed in the cap to threadedly engage a



central threaded seat formed in the transverse second arm to thereby connect the shank to said second arm.

4,421,179

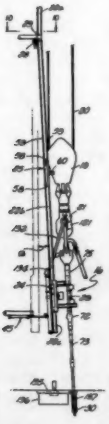
TOP DRIVE WELL DRILLING APPARATUS

George I. Boyadjieff, Anaheim, Calif., assignor to Varco International, Inc., Orange, Calif.

Filed Jan. 23, 1981, Ser. No. 227,587

Int. Cl.³ E21B *15/00, 19/00*

U.S. Cl. 173—44 **12 Claims**



1. Well drilling apparatus comprising:

a mast or derrick;

a drilling unit including an element adapted to be connected

to the end of a drill string for rotation therewith about the axis of the string, and a motor operable to drive said element and the connected string rotatively about said axis;

a pair of elongated first guide rails;

a pair of shorter second guide rails forming lower extensions of said first rails;

a carriage by which said drilling unit is carried and engaging said rails for movement therealong between an upper position of guided engagement with said first rails and a lower position of guided engagement with said second rails;

pivotal connection means mounting said first rails near their upper ends for swinging movement of said first rails and said second rails and said carriage and carried drilling unit relative to said mast or derrick between drilling positions in which said carriage and drilling unit are guided by said first and second rails for movement along said axis of the drill string and inclined positions in which the first and second rails extend at an angle to said axis and guide the carriage and drilling unit for movement along an inclined path at an angle to the axis for access to a mousehole; and

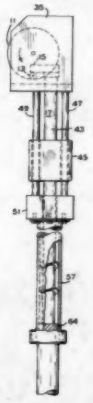
a connection mounting at least one of said second rails to a corresponding one of said first rails for movement therewith between said drilling and inclined positions, and for swinging movement relative thereto with said carriage and drilling unit to move the drilling unit from an active position of alignment with said axis to a retracted position at a side of the axis.

4,421,180

PILE DRIVER

Leonard Fleishman, Woodsburgh, and Henry J. Lynch, Cedarhurst, both of N.Y., assignors to Orin H. Jinnings, Fort Wayne, Ind., a part interest

Filed Feb. 25, 1981, Ser. No. 238,002
Int. Cl.³ B25D *11/10*
U.S. Cl. 173—124 **11 Claims**



1. For use in a pile driving process, a crane supportable hydraulically actuable drop hammer assembly comprising:

a housing supporting a hydraulic drive motor having an axially extending drive shaft and a roller cam offset from the motor drive shaft axis of rotation by a distance limiting the drop hammer free fall distance;

means coupling the roller cam to the drive shaft of the motor to execute circular motion about the axis when the drive motor is operated comprising a circular disk centrally affixed to the motor drive shaft for rotation therewith with the roller cam rotatably affixed to the circular disk off center thereof;

a ram having a substantial mass and having a bearing plate selectively engagable with the roller cam;

bearing support means positioned beneath the circular disk generally tangential thereto to at least partially support the weight of the ram while the ram is being raised;

guide means for limiting ram motion to generally vertical reciprocating motion normally limited at one extreme by a pile being driven and at the other extreme by the uppermost position of the roller cam;

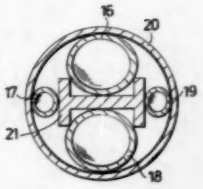
movement of the roller cam in a selected direction along its circular path sequentially repetitively causing the roller cam to engage the underside of the bearing plate, raise the ram, and disengage the bearing plate allowing the ram to fall and impact a pile.

4,421,181

VIBRATION-DAMPING ARRANGEMENT

Roland Andersson, Upplands Väsby; Per-Erik Höglund, and Bo Glimskär, both of Stockholm, all of Sweden, assignors to Byggergonomilaboratoriet HB, Sweden

Filed Jan. 19, 1982, Ser. No. 340,758
Claims priority, application Sweden, Jan. 28, 1981, 8100532
Int. Cl.³ E21B *12/00*
U.S. Cl. 173—162 H **6 Claims**



1. A vibration-damping arrangement for damping of vibrations from a machine (4) or the like, comprising at least one tight, hollow and flexible chamber (11; 12; 13; 16–19; 22) containing a gas with a pressure exceeding ambient pressure and arranged to be supplied with the said vibrations and a rigid casing (9; 14; 20; 36) partially surrounding the gas-filled chamber, arranged to be in contact with the body of a person, characterized in that the wall of the gas-filled chamber (11; 12; 13; 16–19; 22) is essentially non-stretchable.

4,421,182

COMBINATION CLEAN-OUT AND DRILLING TOOL

Arlin R. Moody, Rte. 1, Anton, Tex. 79313, and Bobby J. Moody, Hwy. 114 West, Levelland, Tex. 79336

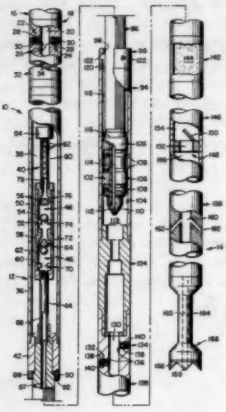
Filed Mar. 16, 1982, Ser. No. 358,652
Int. Cl.³ E21B *21/10*
U.S. Cl. 175—65 **21 Claims**

1. A tool for use in a bore hole for debris collection comprising:

a lower assembly having means for mounting an accessory at the lower end thereof, a debris chamber for holding debris, a trap valve in fluid communication with the bore hole and debris chamber for permitting fluid and debris to flow only from the bore hole into the debris chamber, a barrel section having a smooth, cylindrical inner wall, a lower valve assembly in fluid communication with said barrel section and said debris chamber, said lower valve assembly being activatable between an open position permitting fluid flow between the barrel section and debris chamber and a closed position blocking flow therebetween and said barrel section having a closure means for enclosing one end of the inner wall and having a noncircular aperture therethrough;

an upper assembly having a hollow kelley with a noncircular cross section for sliding motion through the aperture in

said closure means for joint rotation of said upper and lower assemblies, a piston assembly mounted on the kelley in sliding, sealed contact with the inner wall of the barrel section to define a first chamber within the barrel section, said piston assembly having at least one port for communication between the first chamber and hollow kelley, the closure means and piston assembly being engageable, a fluid container and at least one drain valve for fluid communication between the fluid container and the bore hole to relieve fluid pressure within the fluid container, and an upper valve assembly being positioned for fluid communication between the hollow kelley and fluid container permitting flow only from the hollow kelley to the fluid container;



the tool being operable as a hydraulic clean-out tool by removing said lower valve assembly with said upper valve assembly installed and reciprocating the upper assembly, the upward motion of said piston assembly driving fluid and debris from the bore hole into the debris chamber through the trap valve, the trap valve closing and upper valve assembly opening on the downstroke to release the pressure in the debris chamber, the tool being operable as a hydrostatic tool by removing said upper valve assembly with said lower valve assembly installed, downward motion of said upper assembly activating said lower valve assembly to the open position through contact with said piston assembly driving fluid and debris into the debris chamber.

4,421,183

FLEXIBLE DRIVE APPARATUS FOR BORING LATERAL BORE HOLES FROM WELL

Earl R. Collins, Jr., 801 Craig Ave., La Canada, Calif. 91001

Filed Apr. 1, 1981, Ser. No. 249,895

Int. Cl.³ E21B *3/04, 17/20*

U.S. Cl. 174—114 **25 Claims**

1. In combination for penetrating a borehole in an oil well,

a rod movable in rotary and linear directions,

means defining first and second gears at spaced positions on the rod,

the rod having gear teeth on its external surface,

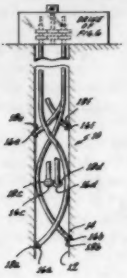
a shaft,

means defining third and fourth gears on the shaft in coupled relationship respectively with the first and second gears on the rod,

a fifth gear on the rod in mesh with the gear teeth on the rod,

clutch means operatively coupled on the rod to the second and fifth gears to provide slippage between the second and fifth gears in accordance with the load on the rod, and

drilling means coupled to the rod for operation in accordance with the rotary and linear movements of the rod, the drilling means being provided with flexible characteristics for penetrating the borehole at adjustable positions



in the borehole and for producing a load on the rod in accordance with the load imposed on the drilling means in the borehole.

4,421,184

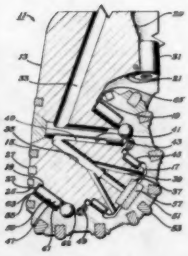
ROCK BIT WITH IMPROVED SHIRTTAIL VENTILATION

John M. Mullins, Houston, Tex., assignor to Hughes Tool Company, Houston, Tex.

Filed Dec. 4, 1981, Ser. No. 327,525

Int. Cl.³ E21B *10/22*

U.S. Cl. 175—337 **5 Claims**



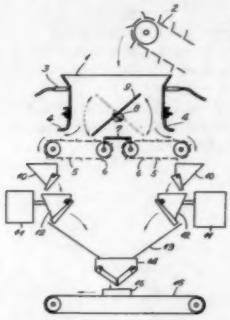
3. In a bit for drilling boreholes in the earth having rotatable cutters mounted on roller bearings on bearing pins that depend from bit legs, passage means extending through the bit legs and bearing pins to the roller bearings for transmitting drilling fluid through the roller bearings, an improved exit for the passage means of each bearing pin, comprising:

slot means formed in the lower end of the bit leg for exposing to the borehole about one-half the diameter of an outer end of each roller bearing when on the lower side of the bearing pin.

4,421,185
COMBINATORIAL WEIGHING SYSTEM

Toshio Koto; Katsuhiko Murakami, and Yugo Fujitani, all of Shiga, Japan, assignors to Kabushiki Kaisha Ishida Koki Seisakusho, Kyoto, Japan

PCT No. PCT/JP81/00213, § 371 Date Apr. 13, 1982, § 102(e) Date Apr. 13, 1982, PCT Pub. No. WO82/00883, PCT Pub. Date Mar. 18, 1982
PCT Filed Sep. 2, 1981, Ser. No. 371,303
Claims priority, application Japan, Sep. 9, 1980, 55-125700; Sep. 9, 1980, 55-128961
Int. Cl.³ G01G *19/22, 13/04*
U.S. Cl. 177—25 7 Claims

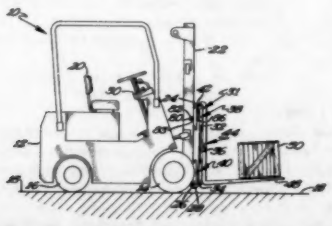


1. A combinatorial weighing system comprising a plurality of weighing mechanisms each comprising a feed hopper, a swing plate installed substantially in the middle of said hopper and adapted to swing in a vertical plane, at least a pair of conveyors extending in mutually opposite directions with their adjoining ends positioned below substantially the middle of the bottom of said feed hopper and with their delivery ends positioned outwardly of the lower ends of the lateral walls of said feed hopper, and at least a pair of automatic weighing machines opposed to each other and positioned below the delivery ends of said conveyors, wherein combinations of the weight values of objects weighed by the automatic weighing machines included in the individual weighing mechanisms are computed to provide a combination of weight values which is equal or the nearest to a predetermined weight.

4,421,186
FORK LIFT SCALE

Richard S. Bradley, Fairmont, Minn., assignor to Weigh-Tronix, Inc., Fairmont, Minn.

Continuation of Ser. No. 180,802, Aug. 25, 1980, abandoned. This application Dec. 28, 1982, Ser. No. 453,996
Int. Cl.³ G01G *19/12*
U.S. Cl. 177—139 9 Claims



1. A fork lift scale for weighing items placed on a fork of a fork lift truck, said fork lift scale comprising:

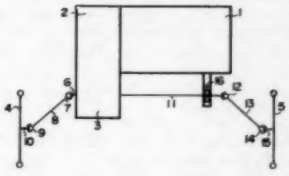
a deformable member for use in attaching a fork to the fork lift truck, said deformable member having a material axis and comprising a single beam being disposed in substantially horizontal relation and extending in a fore and aft direction, said deformable member having opposed substantially vertically disposed planar surfaces intermediate the ends thereof, a plurality of electrical strain gages mounted on said planar surfaces of said deformable member and positioned on the neutral axis of the latter to sense the deformation of said deformable member caused by the weight of an item placed on the fork, the load exerted on the deformable member by the fork of the fork lift truck being spaced longitudinally of said strain gages,

and, a Wheatstone bridge circuit including said strain gages operable to produce an output signal caused by deformation of said deformable member, said strain gages being connected in said bridge circuit to electrically sense vertical load only and being insensitive to and rejecting all other loads, and means for converting the output signal into a perceptive weight readout.

4,421,187
TRANSMISSION WITH ALIGNABLE BEARING SUPPORTING LONGER POWER OUTPUT SHAFT OF DIFFERENTIAL

Takuo Shibata, Toyota; Mitsugu Izuta, Okazaki, and Tetsuya Matano, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Jul. 1, 1981, Ser. No. 279,569
Claims priority, application Japan, Jul. 31, 1980, 55-105265
Int. Cl.³ B60K *17/24*
U.S. Cl. 180—73 D 11 Claims



1. In a vehicle comprising two axially opposed driven wheels and a fixed member, a transmission comprising:

(a) two drive shafts of equal length, each flexibly drivingly coupled at its outer end to one of said wheels;

(b) a differential axially located closer to a first one of said wheels and further from the other one of said wheels, defining a preferred power output line for power output to said other one of said wheels, and comprising:

(b1) a short power output shaft extending towards said first wheel and flexibly drivingly coupled at its outer end to the inner end of the one of said drive shafts whose outer end is drivingly coupled to said first wheel; and

(b2) a long power output shaft extending towards said other wheel substantially along said preferred power output line and flexibly drivingly coupled at its outer end to the inner end of the one of said drive shafts whose outer end is drivingly coupled to said other wheel; and

(c) a support device comprising:

(c1) a bearing, comprising an inner race which supports a part of said long power output shaft remote from said differential, and an outer race which rotatably supports said inner race;

(c2) a support member, which supports said outer race of said bearing so that said inner race is rotatable about a rotational axis substantially parallel to said preferred power output line, and which is coupled to said fixed member of said vehicle; and

(c3) a means for adjusting the position of said rotational axis of said inner race of said bearing with respect to the position of said preferred power output line, in the plane substantially perpendicular to said rotation axis of said inner race, with two degrees of freedom, and for fixing said adjusted position; said adjusting means comprising a first movable member which is movable with respect to said support member with one degree of freedom, and a second movable member which is movable with respect to said first movable member with one degree of freedom, said movement of said first movable member with respect to said support member altering the position of said second movable member with respect to said fixed member, and said second movable member supporting said outer race of said bearing in a fixed relation to said second movable member, said movement of said second movable member with respect to said first movable member altering the position of said outer race with respect to said first movable member; said adjusting means further comprising means for fixing the position of said first movable member with respect to said support member, and for fixing the position of said second movable member with respect to said first movable member; so that said adjusted position of said rotational axis of said inner race of said bearing may be fixed after it has been adjusted;

(d) whereby, by adjusting said adjusting means so as to bring said rotational axis of said inner race of said bearing, and also the rotational axis of said long power output shaft of said differential which is supported thereby, to be substantially coincident with said preferred power output line of said differential, thus compensating for offset in the positioning of said support member, power output from said differential to said long power output shaft may be performed substantially along said preferred power output line, thus minimizing wear on, and maximizing the lifespan of, said differential, and also minimizing side strain on said bearing.

4,421,188
SELF-PROPELLED MULTIPLE-PURPOSE AGRICULTURAL MACHINE WITH DISPLACEABLE DRIVER'S CABIN

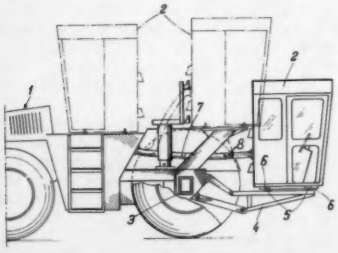
Nils Fredriksen, Harsewinkel, Fed. Rep. of Germany, assignor to Claas OHG, Harsewinkel, Fed. Rep. of Germany

Filed Jun. 30, 1981, Ser. No. 279,039

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1980, 3024650

Int. Cl.³ B62D *33/06*

U.S. Cl. 180—327 **8 Claims**



1. A self-propelled multiple-purpose agricultural machine, particularly a tractor, comprising a chassis; a driver's cabin movable relative to said chassis between at least two working positions and lowerable to a third lower transporting position; at least one machine axle connected with said chassis and located at a predetermined height above a ground level; an auxiliary frame detachably mountable on said machine axle when the machine is to be transported and supporting said driver's cabin when said driver's cabin is lowered from one of said working positions to said third transporting position so that said driver's cabin becomes located in a supporting plane substantially at a height corresponding to the height of said machine axle; and a plurality of control elements extending from said driver's cabin, said control elements being formed so and having a length such that their connection with respective parts of the machine is guaranteed and does not need to be interrupted even when said driver's cabin is lowered to said third transporting position so that for transportation with said lowered cabin the machine can propel itself.

4,421,189
STAIR VEHICLE

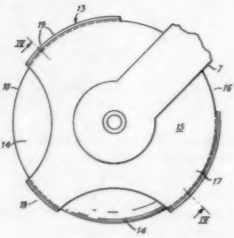
Cecil J. Watkins, Hove, and Simon R. Watkins, Southsea, both of England, assignors to Tobex Motivated Chair Company Limited, Hove, England

Filed Mar. 16, 1982, Ser. No. 358,745

Claims priority, application United Kingdom, Mar. 17, 1981, 8108224; Oct. 5, 1981, 8130044

Int. Cl.³ B62B *5/02*

U.S. Cl. 180—8 A **11 Claims**



1. A device for use in moving a load up or down a stepped path, comprising a structure for receiving the load, at least one support element rotatably mounted on the structure and having rotatably mounted thereon at least three symmetrically disposed wheels whereby, in use, the wheels cooperate with successive steps of the path, and foot means secured to each support element adjacent the corresponding wheel, the foot means being clear of the circumference of the wheel at two regions so that the wheel can roll freely on a plane when the support element is positioned with the wheel and respectively one or other of the adjacent wheels in contact with the plane, and having engagement portions located forwardly of the said two regions so as, when the support element is rotated forwardly of the said position, to engage the plane to prevent rolling movement.

4,421,190
OVERHEAD INSTRUMENT CONSOLE

William E. Martinson, Fargo, and Michael A. Tuchscherer, West Fargo, both of N. Dak., assignors to Steiger Tractor Inc., Fargo, N. Dak.

Filed Jun. 3, 1981, Ser. No. 270,111

Int. Cl.³ B60K *35/00*

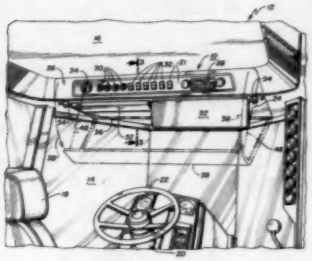
U.S. Cl. 180—90 **5 Claims**

1. An overhead instrument console in combination with a tractor having a driver's compartment with a steering column and steering wheel, and having windows with motor driven windshield wipers, and a ceiling structure, the console comprising:

a panel having vertical and horizontal panel sections and transversely substantially spanning the driver's compartment overhead adjacent to the windows and having a plurality of instruments mounted on the vertical panel portion and extending through to the rear of said panel,

secured to the ceiling structure when in the up position, said panel when in the down position providing access to electrical components and the electrical circuitry located within the ceiling structure and connecting the electrical components located within the ceiling structure;

a hinge pivotally connecting said horizontal panel section to the ceiling structure so that said horizontal panel section constitutes part of the ceiling structure and such that the



panel can be pivotally lowered to a down position without interference from the steering wheel, thus permitting full access to the rear of the instruments mounted on the panel and can be pivotally moved to an up position hiding from view the rear of the instruments mounted thereon; and

means for limiting the downward pivoting of the panel and holding the panel in a downwardly angular plane in a stable position.

4,421,191

POWER ASSISTED STEERING DEVICE FOR A VEHICLE

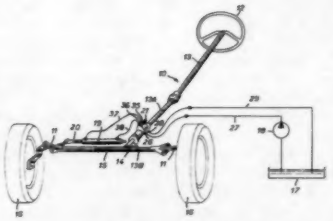
Patrice Bertin, Paris, and Claude Ledamoisel, Asnieres, both of France, assignors to VALEO Societe Anonyme, Paris, France

Filed Sep. 22, 1981, Ser. No. 304,633

Claims priority, application France, Sep. 30, 1980, 80 20892; Feb. 20, 1981, 81 03371

Int. Cl.³ B62D *5/06*; F16K *11/02*

U.S. Cl. 180—132 **12 Claims**



1. A power-assisted steering device for a vehicle, comprising

control means operable to act on steering means, said control means comprising a transmission element in two parts, at least one of said parts being provided with a prism-shaped cavity at its end adjacent the other of said parts, and a prism-shaped plug which is received in said cavity with an angular offset therebetween and is connected to the other of said two parts, the two parts being capable of a limited relative angular displacement which is determined by the said angular offset between the plug and the cavity; and

power-assistance means responsive to relative angular displacement of said two parts to act on said steering means in the same direction of force as the control means, said power-assistance means comprising a hydraulic unit, an actuator acting on the steering means, and a hydraulic distributor located between the hydraulic unit and the actuator, said hydraulic distributor comprising two rotors, each rotationally integral with a respective one of said two parts, and at least one thin annular element, at least one of the said parts being notched on the outside and the associated rotor being notched on the inside, said at least one annular element being toothed both internally and externally and being located between said at least one part and said rotor, the teeth of said element engaging the notches in both said part and said rotor, so that the part and its associated rotor are rotationally integral.

4,421,192

APPARATUS FOR RUNNING A VEHICLE AT A CONSTANT SPEED

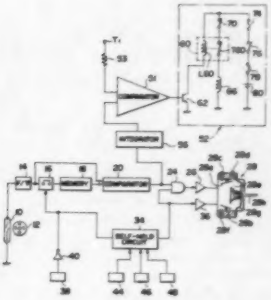
Keiichi Ito, Nagoya; Nobuyuki Yamaguchi; Kazuhiko Hayashi, both of Toyota; Ken Asami, Nagoya; Kazuo Sato, and Takeshi Ochini, both of Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Jan. 7, 1982, Ser. No. 337,713

Claims priority, application Japan, Jan. 20, 1981, 56-7628

Int. Cl.³ B60K *31/00*

U.S. Cl. 180—179 **10 Claims**



1. Apparatus for running a vehicle having an automatic transmission at a constant speed, comprising:

vehicle speed signal generating means for generating a signal representative of an actual speed of said vehicle;

vehicle speed setting means for presetting a desired vehicle speed in a constant speed running condition of said vehicle;

preset vehicle speed signal generating means for holding the output signal of said vehicle speed signal generating means generated when a vehicle speed is preset by said vehicle speed setting means and producing the preset vehicle speed;

vehicle speed compare means for comparing the output signal of said preset vehicle speed signal generating means and the output signal of said vehicle speed signal generating means to produce a signal representative of a compare result;

throttle valve control means for controlling an aperture of a throttle valve in accordance with the output signal of said compare means; and

drive means for driving an engine in accordance with the aperture of said throttle valve,

characterized by:

preset vehicle maintenance detecting means for comparing the output signal of said vehicle speed compare means with a reference signal determined in accordance with the vehicle speed at the time when said vehicle speed setting means presets the desired vehicle speed, the level of the reference signal being determined by the gear position of said automatic transmission and producing a signal when the output signal of said vehicle speed compare means exceeds the level of said reference; signal and

a shift-down circuit for shifting the automatic transmission into a lower gear in the constant speed running condition in response to the output signal from said preset vehicle speed maintenance detecting means.

4,421,193

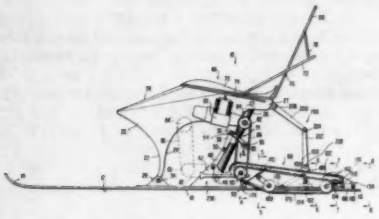
TREAD POWERED SKI

Fred L. Bissett, 1300 Florence St., Aurora, Colo. 80010

Filed Jan. 5, 1981, Ser. No. 222,601

Int. Cl.³ B62M *29/00*

U.S. Cl. 180—192 **18 Claims**



1. A powered ski apparatus, comprising:

a single elongated runner having a forward end portion and a rear end portion;

seat means fastened to said runner for supporting a rider thereon;

track means for producing powered movement of said runner, said track means including first and second continuous treads disposed on opposite lateral sides of the rear end portion of said runner and adapted for ground engagement to produce said powered movement;

engine means for providing a source of power for said track means, said engine means including an output shaft;

power train means for connecting said output shaft to said first and second treads; and

chassis means for supporting said first and second treads, said chassis means including a forward end and a rear end, said forward end being pivotally mounted to said runner about a chassis pivot axis.

4,421,194

TUBING ASSEMBLY IN MUTUALLY MOVABLE PORTIONS OF A THREE-WHEELED MOTOR VEHICLE

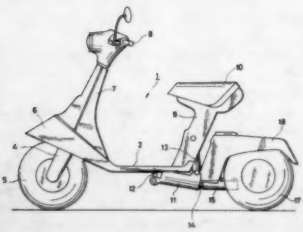
Katsuyoshi Kawasaki, Mitaka, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 6, 1982, Ser. No. 337,549

Claims priority, application Japan, Jan. 27, 1981, 56-9808[U]

Int. Cl.³ B62K *5/04*

U.S. Cl. 180—215 **5 Claims**



1. A tubing assembly for use in a three-wheeled motor vehicle which includes a front body portion providing a front wheel and a fuel tank, a rear body portion providing a power unit and two opposing drive wheels, and connecting means for connecting said front and rear body portions, said front body portion being rotatably mounted about said connecting means and being vertically and longitudinally movable relative to said rear body portion, comprising;

(a) a first flexible tubular member extending substantially vertically and having one end connected to a first rigid tubular member secured to said front body portion and leading to an outlet of said fuel tank;

(b) a second flexible tubular member extending substantially horizontally and having one end connected to a second rigid tubular member secured to said rear body portion and leading to an inlet of said power unit; and

(c) a substantially L-shaped intermediate rigid tubular member having each end connected to the other end of one of said first and second flexible tubular members, said first and second flexible tubular members and said intermediate rigid tubular member being outwardly spaced apart from said axial center of said connecting means and positioned at the same longitudinal side of said three-wheeled motor vehicle.

4,421,195

DEVICE FOR PREVENTING DISPLACEMENT OF AN ENGINE IN A MOTORCYCLE

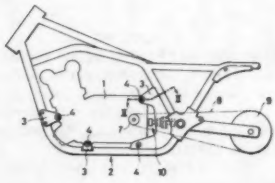
Yasuaki Aiba, Sakado, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 6, 1982, Ser. No. 337,548

Claims priority, application Japan, Jan. 9, 1981, 56-1489

Int. Cl.³ B60K *5/12*

U.S. Cl. 180—228 **7 Claims**



1. In a device for preventing displacement of an engine in a motorcycle having a driving chain adapted to transmit the rotation of said engine to a rear wheel, said engine being mounted on a body frame by a plurality of mounting bolts each extending through one of a plurality of holes formed in said engine, and a plurality of brackets attached to said frame, the improvement which comprises:

a stop supported on said frame behind said engine, said stop including an adjust bolt having a longitudinal axis located on a line joining a center of a sprocket on an output shaft of said engine and a center of a sprocket on the axle of said rear wheel, said longitudinal axis being located in a vertical plane in which said chain lies; and

means for damping the vibration of said engine, said damping means being provided on each of said mounting bolts adjacent to each end thereof, and fitted substantially in each of said holes.

4,421,196

HOMOKINETIC TRANSMISSION JOINT IN PARTICULAR FOR THE DRIVING WHEEL OF A FRONT WHEEL DRIVE VEHICLE

Michel A. Orain, Conflans Ste Honorine, France, assignor to Glaenzer Spicer, Poissy, France

Filed Dec. 7, 1981, Ser. No. 328,443

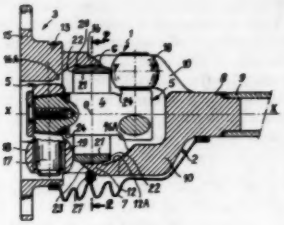
Claims priority, application France, Dec. 19, 1980, 80 27027

Int. Cl.³ B60K *17/30*

U.S. Cl. 180—257 **8 Claims**

1. In a homokinetic transmission joint, in particular for a driving wheel of a front wheel drive vehicle, said joint com-

prising a shaft section, a tripod element carried at each of opposite ends of the shaft section, the two tripod elements being angularly offset from each other at 60°, and two forks each defining three pairs of runways having a circular cross-sectional shape, each tripod element comprising three arms on each of which arms is rotatably mounted and displaceable longitudinally of the arm a spherical roller which is disposed in a corresponding pair of said runways; the improvement com-



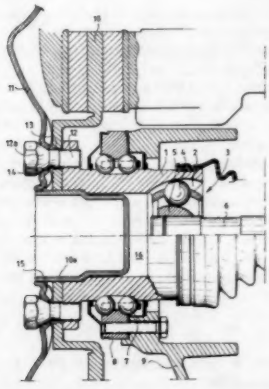
prising for each fork three internally spherical nose portions which axially extend said each fork between the pairs of runways defined thereby, a ring which surrounds, with clearance, said shaft section between the two tripod elements and has an outer spherical surface, the six nose portions cooperating with said outer spherical surface of said ring, and the six rollers being substantially tangent to two end surfaces of said ring when the joint is straight.

4,421,197

DEVICE FOR SUPPORTING A STEERING AND DRIVING WHEEL OF AN AUTOMOBILE VEHICLE

Andre Chandioux, Paris, France, assignor to S.A. Automobiles Citroen and Automobiles Peugeot, both of Paris, France

Filed Nov. 19, 1981, Ser. No. 323,083
Int. Cl.³ B60K *17/30*
U.S. Cl. 180—258 **5 Claims**



1. A support assembly for a steering and driving wheel of an automotive vehicle, the support comprising:

a tubular hub centered on an axis and having an axially outwardly directed face;

a drive shaft at the axis;

a ball-type universal joint having an inner part on the drive shaft and an outer part on the hub, whereby the joint rotationally couples the shaft to the hub;

a brake disk secured to the outer face of the hub and having a hole centered on the axis, the hub having an inside diameter at the outer face equal substantially to the inside diameter of the hole of the brake disk, the wheel being secured with the brake disk to the outer face of the hub; and

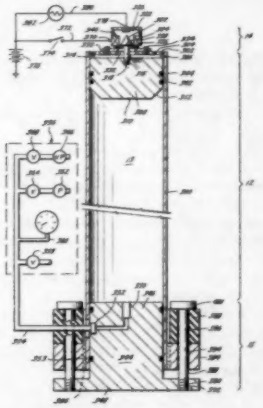
a bowl-shaped sheet-metal seal element fitted snugly into the tube and projecting outwardly therefrom through the hole, the outer diameter of the seal element at the outer face being substantially equal to the inside diameter of the hole and tube, whereby the seal element centers the disk and hub relative to each other.

4,421,198

VARIABLE FREQUENCY VACUUM ACTUATED SEISMIC ENERGY SOURCE

Norvel L. Miller, 11713 Possum Hollow La., Houston, Tex. 77009

Continuation-in-part of Ser. No. 183,800, Sep. 4, 1980, abandoned. This application Nov. 27, 1981, Ser. No. 325,386
Int. Cl.³ G01V *1/147*
U.S. Cl. 181—121 **11 Claims**



1. A thumper-type frequency tunable seismic energy source comprising:

a uniform bore tube open at its top and bottom ends;

a slidingly movable free piston disposed within said tube, said piston movable through the interaction of air pressure and gravity, said piston including piston sealing means for maintaining an annular hermetic sealing contact between the perimeter of said piston and the bore of said tube;

restraining means for releasably holding said free piston proximate the top end of said tube;

a base plate plug slidably disposed at, and extending beyond and outside the bottom end of said tube, said plug including sealing means for maintaining an annular hermetic sealing contact between the perimeter of said plug and the bore of said tube;

frequency adjusting means for varying the rate of kinetic energy transfer between said free piston and said base plate plug with respect to the generation of separate seismic pulses, said frequency adjusting means comprising vacuum application means for selectively creating a pressure lower than atmospheric pressure in said uniform bore tube between said free piston and said base plate plug;

compression control means for preventing the escape of air from said uniform bore tube when said piston falls toward said base plate;

contact pressure application means for biasing the bottom end of said uniform bore tube against the ground in a direction along the longitudinal axis of said tube; and

tube rotation means for adjustably rotatably varying the

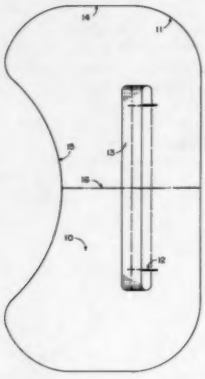
angle of inclination of the longitudinal axis of said uniform bore tube with respect to the ground.

4,421,199

SOUND REFLECTOR TYPE HEARING AID

Charles K. Vrana, 60 Helen La., Ft. Myers Beach, Fla. 33931

Filed Mar. 4, 1982, Ser. No. 354,887
Int. Cl.³ G10K *11/10*
U.S. Cl. 181—136 **2 Claims**



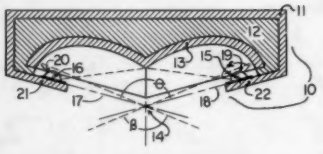
1. An audio sound reflector type hearing aid device comprising a single broad sheet of sound reflecting type material, an endless expansion type holding strap to engage around the head, said holding strap inserted through slots in (a) said single sheet of audio sound reflecting material, said sound reflecting sheet to be positioned around the back of the head, said sound reflecting sheet having a cutaway curve at the lower part of said sound reflector sheet to generally conform with the shape of the neck, said sound reflecting sheet having sound reflecting wings extending outward beyond the ears starting at the approximate point where said endless holding strap enters and leaves said slot in said sound reflector.

4,421,200

ELLIPTICALLY SHAPED TRANSDUCER ENCLOSURE

Michael W. Ferralli, 4055 W. 30th St., Erie, Pa. 16506, and David R. Moulton, 556 Temple Rd., Dunkirk, N.Y. 14048

Filed Dec. 16, 1981, Ser. No. 331,179
Int. Cl.³ H05K *5/00*
U.S. Cl. 181—144 **7 Claims**



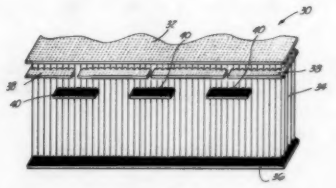
1. An enclosure which comprises, in combination, a number of sound transducers coupled so as to produce sound in phase with one another, and an acoustically reflective shell which is shaped substantially as the envelope of at least sections of at least a number of ellipsoids of revolution equal to the number of transducers, all of which have the identical length of major axis, wherein said ellipsoids of revolution are radially oriented with respect to one another so that their respective major axes all intersect at the same point at various angles with respect to one another and such that said point of intersection is coincident with one focal point of each of said ellipsoids, such focal point thereby being common to all said ellipsoids, and with the other focal point of said ellipsoids being distinct from one another and being radially distributed about this common focal point, and wherein said transducers are located so that at least one such transducer is placed at each distinct focal point, said transducer oriented so that the sound produced by it is directed substantially toward that section of the acoustically reflective shell shaped by the section of the ellipsoid of revolution to which said distinct focal point belongs, so that sound produced by each of the transducers is directed to the above specified portion of the acoustically reflective shell, reflected by it and thence directed, focused and concentrated at the aforementioned common focal point, said sound from all the transducers contained within the enclosure arriving at this common focal point with the same phase.

4,421,201

HIGH EFFICIENCY BROADBAND ACOUSTIC RESONATOR AND ABSORPTION PANEL

Murray D. Nelsen, Goddard; Robert K. Kunze, Jr., Wichita, both of Kans.; Robert F. Olsen, Woodinville, and Ira B. Rushwald, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Sep. 29, 1981, Ser. No. 306,677
Int. Cl.³ B64D *33/00*
U.S. Cl. 181—214 **5 Claims**



1. A sound attenuating panel for installation in the high velocity air flow region of an engine nacelle and other applications requiring acoustic treatment, the panel comprising:

a single layer of cellular honeycomb core;

a first sheet of permeable facing material attached to the top surface of the core;

a first acoustic perforated septum formed internally in the core and parallel to the first sheet, the first septum made up of a plurality of strips having a width W_1 and gap G_1 therebetween;

a second acoustic septum formed internally in the core and parallel to the first septum, the second septum disposed in a spaced relationship below the first septum and made up of a plurality of strips having a width W_2 and gap G_2 therebetween, the width W_2 of the second septum being greater than the gap G_1 with the strips of the second septum indexed below the gaps G_1 of the first septum.

4,421,202

SOUND ATTENUATOR

Robert W. Hoy, Warsaw, Ind., assignor to Peabody ABC Corporation, Warsaw, Ind.

Filed Mar. 20, 1981, Ser. No. 245,903
Int. Cl.³ F01N *1/10*
U.S. Cl. 181—252 **13 Claims**

1. A sound attenuator comprising:

a tubular inner member having an interior and comprising a lattice of reinforcing strand material coated with solidified resin, said strand material being formed in two opposed generally helical patterns that intersect at a plurality of points, said strand material of one said helical pattern being intimately bonded by said solidified resin to said strand material of said other generally helical pattern at

substantially each said point of intersection, said lattice having a plurality of open areas between said strand material;

a tubular outer member having a diameter greater than the diameter of said tubular inner member;

means for retaining said tubular members in concentric relationship to provide a space therebetween; and

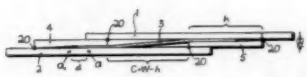
sound absorbing material positioned in said space, said sound absorbing material being in communication with said interior of said tubular inner member through said open areas to provide for sound attenuation.

4,421,203

ROLL-OUT LAYERED EXPANSIBLE MEMBRANES (ROLEM)

John V. W. Bergamini, 520 N. Gilbert St., Iowa City, Iowa 52240

Filed Aug. 25, 1982, Ser. No. 411,264
Int. Cl.³ E04B *1/74*
U.S. Cl. 181—284 **10 Claims**



1. A device which can be unrolled and erected (or expanded) so as to serve as a transparent or otherwise electromagnetic radiation limiting, sound and heat insulating building panel comprised of:

(a) roughly flat components which, when assembled, are adequately flexible to be rolled up and which in cross section resemble a flattened parallelogram,

(b) multiple extruded membranes layered one on top of another whose extreme members constitute, in cross section, two roughly parallel line segments of said parallelogram,

(c) two sidewalls which, in cross section, constitute the other two roughly parallel segments of said parallelogram,

(d) a means for a provision to attach securely said sidewalls of the device to a structural frame as in, for example, a flange running the length of a sidewall providing a surface to fasten the sidewalls to a building frame,

(e) a means of securely attaching intentionally positioned layered membrane edges to one sidewall and the other layered membrane edges to the other sidewall in such a way that when the device is expanded or erected the distance between subsequent roughly parallel membranes and the tension applied to these membranes between the two sidewalls will be predictable, wherein said tension being design-variable by slightly varying the distance between the membranes' attachments to the sidewalls, and thereby varying the extent to which they will stretch when the device is erected or expanded, assuming none are allowed to sag,

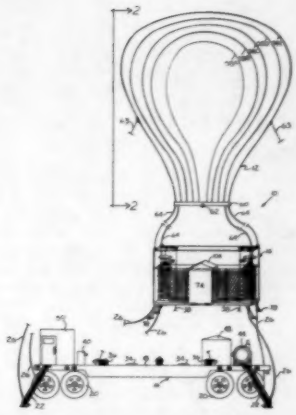
(f) a means of hinging the membranes where they attach to the sidewalls so they hinge at least 90° to the sidewalls so that if the device were unrolled and laid flat, resembling a flattened parallelogram in cross section with the membranes lying one on top of another, then the device could be erected or expanded by turning the sidewalls so they would be roughly perpendicular to the multiple membranes and allowing air into the cavities between the membranes, thereby creating a panel with multiple roughly parallel membranes separated by air spaces and bounded perpendicularly by the sidewalls.

4,421,204

FIRE RESCUE SYSTEM

Bernard L. Lawrence, 901 Yuma, Independence, Mo. 64056, assignor to La Donna Lawrence, Independence Mo.

Int. Cl.³ A62B *1/02*
U.S. Cl. 182—50 **6 Claims**



1. A fire fighting and rescue unit for use in conjunction with high rise buildings, said unit comprising:

trailer means for transporting equipment over the road;

a balloon having a capacity for lifting objects from the ground,

said balloon comprising a plurality of inflatable compartments disposed one in side of the other, each of said compartments being independent of the other, said compartments having a capacity for a quantity of gas such that if some of said compartments are deflated the remaining inflated compartments will continue to carry said load;

a gondola for transporting people and equipment to and from an elevated location;

means coupling said balloon with said gondola for raising and lowering the balloon relative to the gondola;

means coupled with said gondola and operable from said trailer for raising and lowering people and equipment to and from said gondola when the latter is in an elevated location; and

means for coupling said gondola with said trailer while said gondola is raised to a working level by said balloon.

4,421,205

MAGNETIC SHIP'S HOG LINE HOLDER

John M. Vranish, Crofton, and Charles E. Maggelet, Silver Spring, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 1, 1982, Ser. No. 344,450
Int. Cl.³ E04G *3/10*
U.S. Cl. 182—82 **11 Claims**

1. A magnetic holder for securing a platform lowered from the deck of a ship to the surface of the hull of the ship for allowing personnel to service the hull comprising:

a permanent magnetic for creating a magnetic holding force,

a body member containing said magnet, the magnet adapted to secure said body member to the surface of the hull of the ship, said body member including an extension rigidly

attached to its periphery at a location on said body members' longitudinal axis displaced from the magnets' magnetic center of gravity for receiving an external force for removing said body member from the hull surface, said body member including said extension define a lever arm, with which said external force, when applied to the extension, define a turning moment providing a substantial mechanical advantage for overcoming the magnetic hold-

ing force; thereby causing release of the body member from the hull's surface with reduced effort,

a flexible resilient member attaching the platform to body member at the magnetic center of gravity of said magnet, said resilient member adapted to prevent the transmission of impulse forces exerted by the platform to the holder by dissipating the forces through controlled stretching of said resilient member.

4,421,206

LADDER

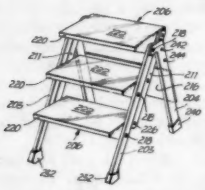
Walter Kümmerlin, Bietigheim-Bissingen, In den Fressäckern 6, Fed. Rep. of Germany

Filed Jan. 27, 1981, Ser. No. 228,833

Claims priority, application Fed. Rep. of Germany, Feb. 2, 1980, 3003854; May 21, 1980, 3019345; Sep. 24, 1980, 3035955

Int. Cl.³ E06C 1/16

U.S. Cl. 182—156 **15 Claims**



1. In a stepladder, with two legs which are connected with each other swingably around an axis in the region of an upper end of the legs, at least one of the legs has transverse support members which are supported by a first pair of stiles, and arranged spaced apart from each other in the longitudinal direction of the first pair of stiles to form the treads, said transverse support members being developed as board-shaped treads which, when the legs are spread apart a predetermined maximum distance, the standing surface of the transverse support members is horizontal and lies in horizontal planes, the treads being connected swingably about axes parallel to each other, to the first pair of stiles and to respective link members which are parallel to the first pair of stiles, the improvement comprising

a mutual supporting relationship between the first pair of stiles and the link members upon a predetermined maximum spread of the legs so as to increase the resistance to bending of the first pair of stiles and limit the swingability of the treads around their axis in a first direction of swing, the treads projecting beyond one side edge of the first pair of stiles facing away from the other leg such that stepping upon the treads causes a moment of rotation in a second direction which brings the link members towards the first pair of stiles, and the depth of the treads and the difference in height between two successive treads is within a predetermined dimensional range customary for stairs,

the respective link members are associated with respective stiles of said first pair and the other said leg comprises a second pair of stiles, a double-armed swing lever being supported for swinging on at least one of the two stiles of the first pair for movement about an axis parallel to the axis of swing of the legs, one arm of said swing lever being pivoted to the link member associated with said one stile of said first pair and the other arm of said swing lever being connected to a corresponding stile of said other leg,

the swing leverl includes a driver and the other leg includes a slot guide engaged by said driver.

4,421,207

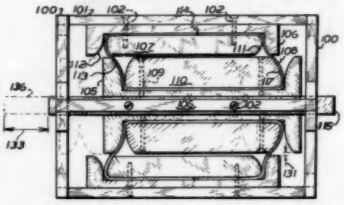
COMBINATION ANTI-FRICTION BEARING AND FORCE-GENERATING MECHANISM

David G. Falconer, 4673 S. 34 St., Arlington, Va. 22206

Filed Nov. 10, 1981, Ser. No. 319,910

Int. Cl.³ F03G 3/06; F16F 1/26

U.S. Cl. 185—29 **9 Claims**



1. In a linear bearing and force generating mechanism, an outer frame having a first set of cams attached thereto, an inner shaft having a second set of cams attached thereto, flexible pendulums connecting and partially wrapping around said first and said second set of cams, the contours of said first set of cams and said second set of cams being so shaped that said flexible pendulums are formed and constrained by contact around said contours that the swinging movement of said flexible pendulums cause said shaft to move in a non-arcuate and linear manner.

4,421,208

UPRIGHT FORK LIFT TRUCK

Richard H. Robinson, Jr., Kalamazoo, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

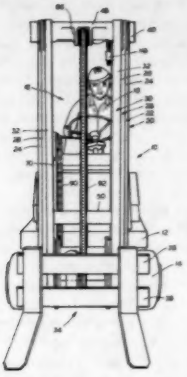
Filed Feb. 9, 1981, Ser. No. 232,762

Int. Cl.³ B66B 9/20

U.S. Cl. 187—9 E **40 Claims**

1. An upright structure for lift trucks and the like having a fixed upright section, a first telescopic upright section mounted for elevation relative to said fixed section, a second telescopic upright section mounted for elevation relative to said first telescopic section and elevatable load carrier means mounted for elevation relative to said second telescopic section, the improvement comprising a first lift cylinder means secured to support means, a second lift cylinder means secured to said support means, first flexible lifting means operatively connecting said first cylinder means to said load carrier means for elevating said load carrier means on said second telescopic upright section independently of said second cylinder means, and second flexible lifting means operatively connecting said

second cylinder means to one of said telescopic upright sections, said second cylinder means and second flexible lifting



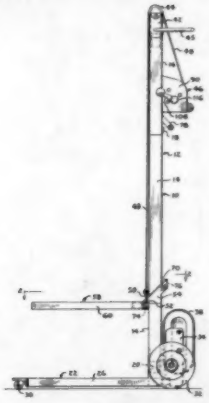
means being operatively connected in the upright structure to elevate said first and second telescopic upright sections.

4,421,209

LIFT APPARATUS

Howard H. Vermette, and Andrew H. Daugherty, both of Hammond, Ind., assignors to Vermette Machine Company, Inc., Hammond, Ind.

Filed Jan. 25, 1982, Ser. No. 342,653
Int. Cl.³ B66B 9/20
U.S. Cl. 187—9 R 8 Claims



1. A list apparatus which includes a base, a post mounted upright on said base, said post having a forward side, a back side and opposing lateral sides relative to said base, a cable return sheave mounted on said post, a winch device provided on said back side of said post, means on said post moveable along said post, said means having one end extending forward of said forward side of said post and an opposing other end at said back side of said post, a lift table supported at said one end of said means, said lift table extending horizontally from said forward side of said post, a cable connected at one end to said winch device and at the other end to said means and moveable over said cable return sheave for moving said means and said lift table along said post, wherein the improvement thereof comprises:

a cross bar connected to said post spaced from said back side thereof;

said means and said lift table being pivotable on said post from a horizontal position to a vertical position;

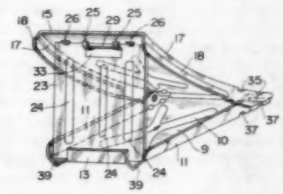
and said other end of said means formed to extend rearward of said back side of said post at an incline so as to clear said cross bar when said lift table extends horizontally from said post, and engage said cross bar at said incline when said lift table and said means are pivoted from the horizontal toward the vertical when said means is moved along said post adjacent said cross bar.

4,421,210

WHEEL STOP APPARATUS

Yosiharu Sugino, Nagoya, Japan, assignor to Sugino Press Co., Ltd., Japan

Filed Jul. 22, 1981, Ser. No. 285,859
Int. Cl.³ B60T 3/00
U.S. Cl. 188—32 3 Claims



1. Wheel stop apparatus, comprising:

a bottom plate having a pair of lateral sides;

a ramp board having a pair of lateral sides;

means pivotably interconnecting said ramp board to said bottom plate adjacent respective lateral sides of said bottom plate and ramp board;

a check plate hingedly connected to the underside of said ramp board adjacent the lateral side opposite said pivotable interconnection;

said check plate having a pair of mutually spaced apart end edges, and having an open portion adjacent one said end edge so as to form an axle between said one end edge and said open portion;

a pair of separate and mutually spaced apart axle bearing members each formed on the underside of said ramp board and extending downwardly and around said axle of said check plate, so that said axle and said pair of bearing members comprises said hinged interconnection between check plate and ramp board; and

a pair of checking protrusions formed on the underside of said ramp board;

said checking protrusions respectively flanking said pair of axle bearing members and located in relation to said check plate axle so as to be engaged by said one end of the check plate when said ramp board and bottom plate are pivotably opened and said check plate is pivoted to extend away from the ramp board underside;

so that the other said end edge of said check plate engages said plate to maintain said pivotable separation of ramp board and bottom plate; and

said checking protrusions, by engaging the check plate, stabilize said hinged interconnection of ramp board and check plate.

4,421,211

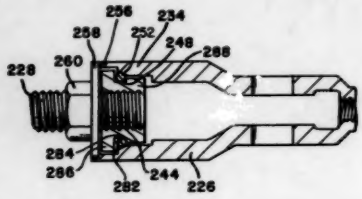
CONNECTION MECHANISM FOR AUTOMATIC SLACK ADJUSTER

Fred W. Hoffman, Brunswick, and Raphael A. Barrios, Elyria, both of Ohio, assignors to The Bendix Corporation, Southfield, Mich.

Continuation of Ser. No. 841,266, Oct. 12, 1977, abandoned. This application Nov. 24, 1978, Ser. No. 963,252

Int. Cl.³ F16D *65/52*

U.S. Cl. 188—79.5 K **6 Claims**



1. In a vehicle braking system, a brake actuating lever, a yoke pivotally connected to said lever, a thrust rod, a fluid pressure responsive actuator connected to said thrust rod for urging the latter in a brake application effecting and brake releasing directions and means attaching said yoke to said thrust rod, said yoke including a recess having an entrance through which one end of said thrust rod extends, said attaching means including an adapter movable axially on said thrust rod and located in said recess, first connecting means carried by said yoke and projecting into said recess for engagement with said adapter to define a connection between said yoke and said adapter which does not transmit braking thrust, and second connecting means carried by said thrust rod and cooperating with said yoke to transmit braking thrust to the lever when a brake application is effected, said yoke defining first and second transverse thrust-receiving surfaces circumscribing said thrust rod, said second connecting means including first thrust transmitting means carried by said thrust rod for engagement with the first thrust-receiving surface, and second thrust transmitting means carried by said adapter for engagement with the second thrust-receiving surface.

4,421,212

BRAKE CONTROL VALVE ARRANGEMENT

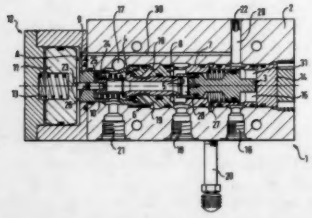
Franz Fleck, Frankfurt am Main, Fed. Rep. of Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed Nov. 19, 1981, Ser. No. 322,825

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1980, 3047814

Int. Cl.³ B60T *11/10*

U.S. Cl. 188—152 **15 Claims**



1. An arrangement for controlling the pressure of hydraulic braking fluid supplied in dependence on the position of a brake actuating member, especially a brake pedal, to at least one brake actuating cylinder of a hydraulic braking system including a low-pressure supply reservoir, a control pressure source responsive to movement of the brake actuating member, and an actuating pressure source, comprising housing means having an internal bore and supply, control, pressure and relief ports communicating with said bore and, when the arrangement is incorporated in the braking system, with the brake actuating cylinder, the control pressure source, the actuating pressure source, and the supply reservoir, respectively; an elongated hollow valve member received in said bore for axial movement therein and having a first and a second end portion; a control piston axially movably received in said bore at said first end portion of said valve member and having an end face which faces away from said valve member and delimits a control compartment communicating with said control port; first valve means rigid with said first end portion of said valve member and with said control piston for controlling the flow of hydraulic fluid between said supply and relief ports; second valve means rigid with said second end portion of said valve member and with said housing means for controlling the flow of hydraulic fluid between said actuating and supply ports; a compression spring acting on said second end of said valve member in a predetermined direction toward said control piston to urge said valve member toward an end position in which said first valve means is open and said second valve means is closed; and means for reducing the loading of said compression spring in proportion to the magnitude of the pressure supplied by the control pressure source into said control compartment.

4,421,213

HYDRODYNAMIC TORQUE-TRANSFER UNIT, ESPECIALLY A HYDRODYNAMIC BRAKE

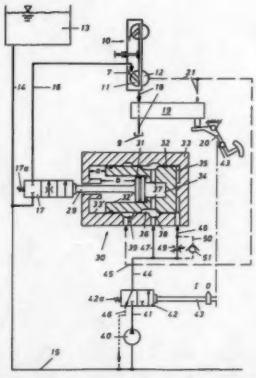
Klaus Brosius, Heidenheim, and Berthold Herrmann, Gerstetten, both of Fed. Rep. of Germany, assignors to Voith Getriebe KG, Fed. Rep. of Germany

Filed Oct. 29, 1981, Ser. No. 316,524

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1980, 3040790

Int. Cl.³ F16D *57/02*

U.S. Cl. 188—296 **27 Claims**



1. A hydrodynamic torque transfer unit, comprising:

a housing with a working chamber; a stator in the working chamber; a rotor rotatably held in the working chamber, rotatable with respect to the stator and positioned with respect to the stator for torque transfer therebetween in the presence of working fluid in the working chamber;

a working fluid inlet to the working chamber and a working fluid outlet from the working chamber, such that the selective filling of the working chamber through the inlet and the removal of working fluid therefrom through the outlet establishes the torque to be transferred through the working chamber;

an inlet valve connected to the inlet for regulating the amount of working fluid to pass through the inlet; the valve having a fully open condition at which it permits passage to the inlet of a larger rate of flow of working fluid and having a partially open condition at which it permits passage to the inlet of a smaller rate of flow of working fluid;

a control device connected to the valve for moving the valve through its conditions; the control device comprising a first control element connected with the valve for moving the valve, and the first control element being movable from a rest position, through an intermediate activated position at which the valve is in the partially open condition, to a fully activated position at which the valve is in the fully open condition;

a first pressure chamber behind the first control element such that when the first control element is in the rest position and the first pressure chamber is pressurized, the first control element is initially driven to the fully activated condition;

a change over device having a pressurizing condition at which it connects the first pressure chamber to a source of pressure medium for first pressurizing the first pressure chamber to move the first control element to the fully activated position; the change over device having a non-pressurizing condition at which it connects the first pressure chamber with the pressure in the working chamber, whereby the pressure in the working chamber acts upon the first pressure chamber, for thereafter discharging the pressure of the first pressure chamber, when the pressure in the working chamber is low enough to enable such discharge, and the discharge from the first pressure chamber being for causing the return of the first control element toward the rest position thereof;

the change over device including preventing means for preventing the return of the first control element beyond the intermediate activated position toward the rest position;

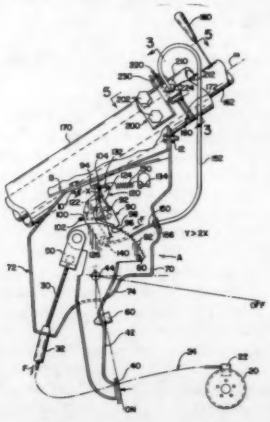
an activator operable both for causing pressurization of the first pressure chamber with the change over device in the pressurizing condition and for causing operation of the change over device to the non-pressurizing condition thereof.

4,421,214

SYSTEM FOR AUTOMATICALLY RELEASING PARKING BRAKES

Daniel J. Sellmeyer, Royal Oak, Mich., assignor to Gulf & Western Industries, Inc., Southfield, Mich.

Filed Dec. 16, 1980, Ser. No. 216,945
Int. Cl.³ B60K *41/26*
U.S. Cl. 192—4 A **4 Claims**



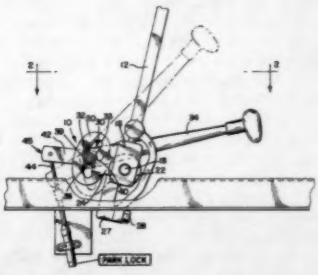
1. In a system for releasing the parking brakes of a wheeled vehicle having a transmission control manually shiftable between a non-driving condition and a drive condition, said system including mechanical means for setting the parking brakes in a set condition, mechanical locking pawl means coacting with a toothed sector for retaining the parking brakes in the set condition, a release lever pivoted about an axis between a first inactive position and a second position, means responsive to pivotal movement of said release lever into said second position for releasing said mechanical locking pawl means and allowing the brakes to be released, an elongated flexible element for pivoting said lever from said first position to said second position to release said locking pawl means when said flexible element is pulled in a selected direction, and biasing means pivotally urging said lever into said first inactive position and also urging said flexible element in a direction opposite to said selected direction, the improvement comprising: a device for automatically pulling said flexible element in said selected direction when said transmission control is shifted into a drive condition, said automatic device comprising: a cam sector with a generally arcuate cam surface and pivoted about a given axis generally at the center of said arcuate cam surface as said transmission control is manually shifted between a park, reverse, neutral and drive position, a fixed bracket adjacent said pivotable cam sector, a bell crank pivoted on said bracket about a second axis generally parallel to said given axis and having first and second ends, means for connecting said fist end onto said flexible pulling element whereby said element is pulled by said bell crank as said bell crank is pivoted in a first direction, and a cam follower on said second end and riding along and biased against said arcuate cam surface, by said biasing means urging said flexible element in said opposite direction, to position the said lever in and predetermine the said first inactive position thereof; said arcuate cam surface having first and second lobe portions; said first lobe portion for forcing said follower in a direction pivoting said bell crank in said first direction, when said transmission control is in said drive position, to cause the said flexible element to pivot the said release lever to the said second position thereof so as to effect the release of the said locking pawl means and the parking brakes, and said second lobe portion for forcing said follower likewise in a direction pivoting said bell crank in said first direction, when said transmission control is in said reverse position, to similarly effect the release of the said locking pawl means and the parking brakes.

4,421,215

PARK LOCK INTERLOCK CONTROL SYSTEM

Glen R. Bellah, Bolingbrook; Lawrence M. Sobol, Hinsdale; Lloyd B. Idelman, Evanston, and Vo V. Thanh, Willowbrook, all of Ill., assignors to International Harvester Co., Chicago, Ill.

Filed Sep. 28, 1981, Ser. No. 306,022
Int. Cl.³ B60K *41/26*; G05G *11/00*
U.S. Cl. 192—4 A **5 Claims**



1. A park lock interlock control system for engagement and

disengagement of a park lock in a vehicle drive train having a range shift transmission, the system comprising:

a transmission shift lever reciprocably movable between a plurality of gear positions and controlling said transmission, said gear positions including a neutral position;

said transmission shift lever connected with a transmission pivot shaft;

a range shift plate integrally attached to said transmission shift lever and movable therewith;

said plate having a slot means;

a park lock lever disposed in the vicinity of said transmission shift lever and rigidly secured to a park lock crossover shaft extending transversely thereto and interconnected with said park lock;

said crossover shaft including a finger projecting through said plate slot means;

said finger having guiding means permitting said plate to reciprocably and slidably move across said finger;

said plate means automatically impeding the rotational movement of said finger therewithin;

said plate slot means having an enlarged section wherein said finger being able to rotate, thereby actuating said park lock for immobilization of the vehicle drive train.

4,421,216

HOUSING FOR VISCOUS FLUID COUPLING DEVICE

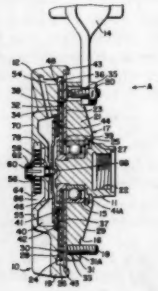
Norman Ellis, Huddersfield, England, assignor to Holset Engineering Company Limited, Huddersfield, England

Filed Apr. 24, 1981, Ser. No. 257,079

Claims priority, application United Kingdom, May 3, 1980, 8014906

Int. Cl.³ F16D *35/00, 43/25*

U.S. Cl. 192—58 B **9 Claims**



1. A viscous shear fluid coupling comprising:

a central shaft having a disk connected thereto;

an annular housing having a cover attached thereto and defining therebetween an annular working fluid chamber in which said disk is positioned, said housing comprising a spider member of ferrous material including a hub with a central bore through which said shaft extends and a plurality of integral radially extending arms, each having an arcuate shoulder at the same radial distance from the axis of said housing for mounting a component, said housing further comprising a circular plate of ferrous material abuting one face of the arms for forming a portion of said working fluid chamber, said circular plate having a central opening concentric with and of a diameter less than the bore diameter for forming an abutment; and

bearing means positioned in said bore against said abutment for journaling said housing relative to said central shaft.

4,421,217

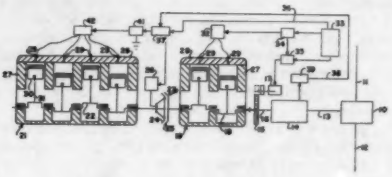
PROPULSION SYSTEM FOR A VEHICLE

Ernest Vagias, 265 Prospect St., Baden, Pa. 15005

Filed Jan. 6, 1981, Ser. No. 223,022

Int. Cl.³ B60K *41/02*; F01B *21/02*; F16D *25/08*

U.S. Cl. 192—0.098 **5 Claims**



1. A propulsion system for a vehicle including the combination of first and second internal combustion engines each having an ignition system and a crankshaft, clutch means to drivingly connect and disconnect the respective crankshafts of said internal combustion engines, said clutch means including a first clutch member mounted onto the crankshaft of said first internal combustion engine and a second clutch member mounted onto the crankshaft of said second internal combustion engine to engage with said first clutch member, switch means to energize the ignition system of said second internal combustion engine when said clutch is engaged and during the time when at least the ignition system for said first internal combustion engine is operating, means including a transmission to deliver torque from said first internal combustion engine when said clutch means is disengaged or from said first and second internal combustion engines when the crankshafts thereof are connected together by said clutch means, means to support said second internal combustion engine for movement toward and away from said first internal combustion engine for engaging and disengaging said clutch means, actuator means to move said second internal combustion engine for engaging said first and second clutch members, and control means responsive to said switch means for energizing said actuator means to engage said first and second clutch members.

4,421,218

RELIEF VALVE MEANS FOR ROTATABLE FLUID-PRESSURE MECHANISMS

Robert E. Haight, Waterloo, Iowa, assignor to Deere & Company, Moline, Ill.

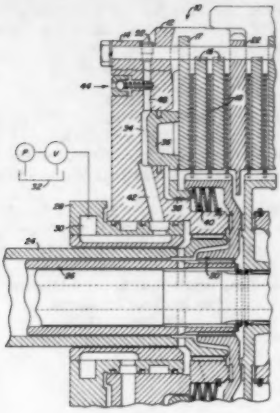
Filed Feb. 2, 1981, Ser. No. 230,464

Int. Cl.³ F16D *25/063*

U.S. Cl. 192—106 F **3 Claims**

1. Hydraulically-operated, power transmitting mechanism having a housing rotatable about an axis and including a first axially fixed radial wall and a second, axially shiftable radial wall defining between them a chamber whose volume varies in response to control means operative to selectively pressurize and depressurize the chamber, and pressure relief valve means of the centrifugally responsive type including a passage extending through one wall on an axis parallel to and spaced radially from the axis of rotation and leading from the chamber to a dump outlet exteriorly of the chamber, a seat in and coaxial with the passage and a ball closable on the seat via pressurizing of the chamber irrespective of speed of rotation of the housing and unseatable via centrifugal force upon depressurizing of the chamber so as to accelerate the exhaust of fluid from the chamber, characterized in that spring means acts on the ball in its seating direction to retain the ball seated upon depressurizing of the chamber by the control means during speeds of rotation of the housing below a predetermined value and to enable unseating of the ball during depressurizing of the cham-

ber via the control means during speeds of rotation above said value and the chamber is extended radially as a passage intersecting the relief passage and the spring means acts between the ball and the intersection of the passages.

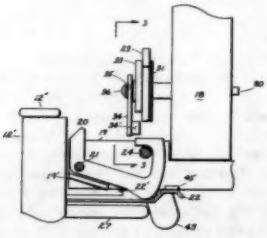


4,421,219

DUAL PRICE CAM SYSTEM FOR TOTALIZING VENDOR

Donald K. Christian, 119 Woodbine Ter., Spartanburg, S.C. 29301

Filed Aug. 31, 1981, Ser. No. 298,204
Int. Cl.³ G07F 5/20
U.S. Cl. 194—1 L **4 Claims**



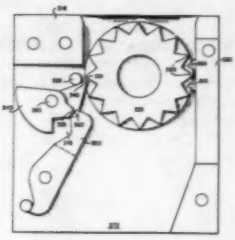
1. A multiple price system for actuating a vending machine comprising: a housing containing a totalizer with a shaft that incrementally rotates in response to the insertion of coins, a multilobal price cam mounted to rotate with said shaft, an intermediate link pivotally mounted on said shaft, a product release means which when allowed to move in a path prevents the vending of products and when restricted from moving in said path allows the vending of products and a price selection device which cooperates with said intermediate link to pivot said link from a first position of non intervention to a second position of intervention along said path of the product release means, wherein said multilobal price cam, incrementally rotated by said totalizer, is so associated with said product release means that prior to a predetermined number of rotational increments said product release means remains unrestricted in said path by any lobe of said price cam and no product is made available or, subsequent to said predetermined number of rotational increments, said product release means is restricted in said path by a first lobe of said multilobal price cam making said product available and; wherein said intermediate link may be pivoted by said price selection device from said first position of nonintervention to said second position of intervention along said path of said product release means between a second lobe of said cam and said product release means in such a manner that said product is made available with fewer rotational increments of said price cam than said predetermined number of rotational increments.

4,421,220

TOKEN MECHANISM WITH MAGNETIC SEPARATION MEANS

Myron I. Jaffe, Chestnut Hill, Mass., assignor to Sintered Metals, Inc., Boston, Mass.

Continuation-in-part of Ser. No. 321,721, Nov. 16, 1981. This application Nov. 9, 1982, Ser. No. 439,822
Int. Cl.³ G07D 7/00
U.S. Cl. 194—4 D **6 Claims**



1. A token acceptance mechanism for use with a disk-shaped token having a first layer with a notched periphery, and at least one adjacent layer with a smooth periphery and a diameter at least as large as the notched portion of said first layer, comprising,

first movable means engageable with said notched periphery,

second movable means engageable with said smooth periphery, and

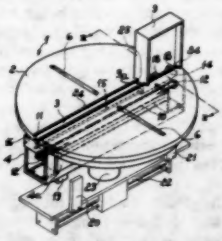
means responsive to movement of said first and second means to reject a counterfeit token having a notched portion of a greater diameter than an adjacent layer with a smooth periphery.

4,421,221

REVOLVING TABLE FOR BOOK-BINDING STACKERS AND THE LIKE

Giorgio Pessina, and Aldo Perobelli, both of Paderno Dugnano, Milano, Italy

Filed Feb. 3, 1982, Ser. No. 345,416
Claims priority, application Italy, Feb. 6, 1981, 19561 A/81
Int. Cl.³ B65H 31/30
U.S. Cl. 198—372 **6 Claims**



1. A revolving table for book-binding stackers and the like, comprising a table body, a movable stack positioner on said

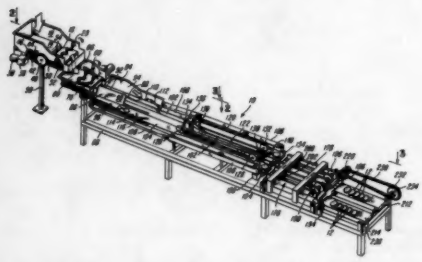
table body, a pusher on said table body for ejecting stacks previously positioned by said stack positioner on said table body, means for moving said pusher and means for stepwise rotating said table body about an axis of said table body to eject said stacks according to selected directions, wherein said means for moving said pusher comprise a diametrical slot in said table body, a hollow beam fastened to said table body below thereof and extending across said axis of said table body parallel to said slot, a cylinder-piston unit arranged within said hollow beam and extending in the direction of said hollow beam, a drive means secured to said pusher and said piston within said hollow beam and operable by said piston, a means for guiding said pusher along said slot, and means arranged centrally of said table body below said cylinder-piston unit and said hollow beam for supplying compressed air to said cylinder-piston unit for reciprocating said drive means across said axis of said table body.

4,421,222

APPARATUS FOR ARRANGING WORKPIECES IN A PREDICTABLE RELATIONSHIP AND GROUPING

Karl H. Stuermer, New Richmond, Ohio, assignor to Planet Products Inc., Cincinnati, Ohio

Filed Aug. 14, 1981, Ser. No. 292,741
Int. Cl.³ B65G *47/24*
U.S. Cl. 198—382 **17 Claims**



1. An apparatus for arranging randomly oriented workpieces in a predictable pattern, comprising:

a pair of downwardly converging surfaces, said converging surfaces being obliquely oriented to the horizontal;

a first convoluted transport conveyor, said transport conveyor extending through said pair of converging surfaces, said first transport conveyor being in substantially the same plane as the first of said pair of obliquely oriented converging surfaces, said first transport conveyor extending downstream of said converging surfaces and changing planes at a downstream location to a substantially horizontal orientation;

a second convoluted transport conveyor, said second conveyor extending through said pair of converging surfaces, said second transport conveyor being in substantially the same plane as the second of said pair of obliquely converging surfaces, said second transport conveyor extending downstream of said converging surfaces and changing planes at a downstream location to a substantially perpendicular relationship with respect to said first transport conveyor, said second transport conveyor having a substantially vertical orientation at the location said first transport conveyor has a substantially horizontal orientation;

at least one finger-like guide for flipping said workpieces resting on said second converging surface onto said first convoluted transport conveyor as said workpieces are advanced past said guide by said first and said second convoluted transport conveyors, said guide obliquely extends outwardly in the downstream direction of movement of said first and said second convoluted transport conveyors from said second converging surface; and

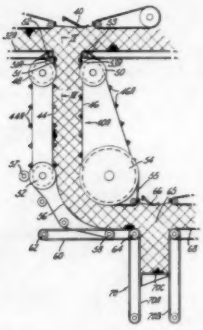
means for transporting and discharging a plurality of said workpieces into said pair of converging surfaces, said means for transferring and discharging being located upstream of said converging surfaces.

4,421,223

CONVEYOR SYSTEMS FOR CIGARETTES AND OTHER ROD-LIKE ARTICLES

Desmond W. Molins; Dennis Hinchcliffe, and Peter A. Clarke, all of London, England, assignors to Molins Limited, London, England

Division of Ser. No. 408,256, Oct. 23, 1973, Pat. No. 4,120,391.
This application May 2, 1978, Ser. No. 902,054
Claims priority, application United Kingdom, Oct. 27, 1972, 49787/72
The portion of the term of this patent subsequent to Oct. 17, 1995, has been disclaimed.
Int. Cl.³ B65G *15/14*
U.S. Cl. 198—604 **5 Claims**



1. A vertical feed for conveying a continuous stack of cigarettes upwards or downwards, comprising a first substantially horizontal conveyor, a pair of spaced parallel conveyors extending upwards from the horizontal conveyor and having their center lines in a vertical plane containing the center line of the horizontal conveyor, a rotatable member around which the stack of cigarettes are conveyed in passing between the first conveyor and the pair of conveyors, a band extending from positions adjacent to but laterally offset from the first conveyor and one of the pair of conveyors, and defining the outer periphery of a curved passage extending part of the way around the rotatable member for the conveyance of the cigarettes between the first conveyor and the pair of conveyors, and means for driving said band at a speed greater than the peripheral speed of said rotatable member.

4,421,224

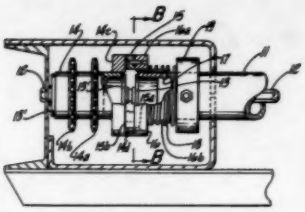
DRIVEN ROLLER FOR ACCUMULATOR CONVEYOR

Robert D. Dingman, 28118 Wildwood Trail, Farmington Hills, Mich. 48018

Filed Nov. 30, 1981, Ser. No. 325,748
Int. Cl.³ B65G *13/06*
U.S. Cl. 198—781 **1 Claim**

1. For use in an accumulation type of conveyor with one or more live rollers, a live roller drive mechanism comprising: a driving roller and a driven roller mounted for rotation on a fixed shaft, a driving member mounted on said driving roller and having an axially disposed annular surface, a drive sleeve disposed loosely over the end of the driven roller to permit a limited degree of angular misalignment relative to said driven roller, means coupling said drive sleeve to said driven roller for

imparting rotative motion thereto and for permitting angular and axial motion of the drive sleeve relative to the driven roller, an annular torque transmitting member carried by said drive sleeve having an axially disposed annular surface positioned in face-to-face opposition with the annular surface on said driving member, and a spring retained on said driven roller and urging the torque transmitting member into face-to-face engagement with said driving member.



4,421,225

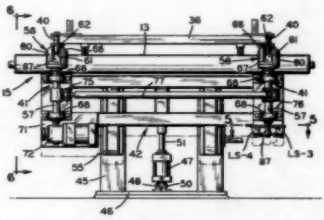
MATERIAL HANDLING APPARATUS

Thomas Hetman, Jr., Perrysburg, Ohio, assignor to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Sep. 8, 1981, Ser. No. 299,933

Int. Cl.³ B65G *21/20*

U.S. Cl. 198—345 **5 Claims**



1. An apparatus for locating an article on a conveyor roll system comprising: a frame, a conveyor comprised of a series of spaced, rotatable conveyor rolls mounted on said frame for supporting and advancing an article in a substantially horizontal path of movement, means for interrupting movement of said article at a predetermined location on said conveyor, said means including at least two locating heads spaced apart across said path above said conveyor rolls and provided with slots for receiving spaced apart projections extending downwardly from said article for arresting movement of said article on said conveyor rolls, means for rotating said locating heads after receiving said article projections to lock said article in said arrested position on said conveyor rolls, and means for retracting said locating heads below said conveyor rolls to permit continued movement of said article on said conveyor along said path.

4,421,226

ARTICLE RECEIVING AND DECELERATING DEVICE

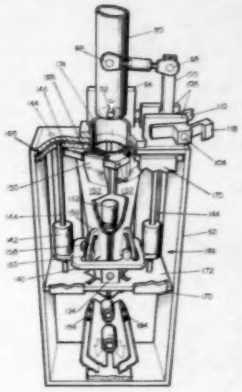
Otto Zauner, Vineland, N.J., assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Mar. 30, 1981, Ser. No. 248,669

Int. Cl.³ B05G *47/44*

U.S. Cl. 198—534 **25 Claims**

1. A device for receiving and decelerating articles discharged from moving sites on a machine, comprising, in combination, means for receiving such articles from such moving sites including a receiving tube having a first end and a second end, said first end including means for pivotally supporting said receiving tube, a plurality of moveable wall segments defining an article receiving chamber, the first end of the receiving tube being located below the moving sites and the second end being located above and adjacent to the chamber, collar means disposed about said wall segments and located near the lower half of wall segments, the collar means being so constructed and arranged that the collar means reciprocates generally vertically to urge said wall segments toward one another to collapse the chamber to thereby decelerate the article and maintain its orientation and to urge the wall segments away from each other to expand the chamber, and drive means for oscillating said receiving means and for translating said collar means disposed about said wall segments to urge said wall segments toward and away from each other.



4,421,227

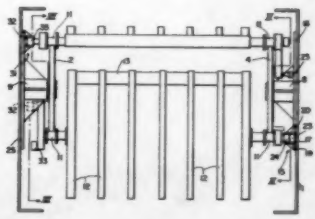
TILTING SHELF, VERTICAL CONVEYOR

Andrew T. Koraylak, Hamilton, Ohio, assignor to Koraylak Corporation, Hamilton, Ohio

Filed Jun. 16, 1981, Ser. No. 274,471

Int. Cl.³ B65G *17/18*

U.S. Cl. 198—800 **5 Claims**



1. A tilting shelf, vertical conveyor, comprising:

a frame having an upper end, a lower end, a front transfer area, and a rear return area opposed to said front area;

two sprockets mounted for rotation about a horizontal axis on said frame at said upper end;

two sprockets mounted for rotation about a horizontal axis on said frame at said lower end;

two endless chains drivingly engaging and operatively mounted about said respective upper and lower pairs of sprockets for rotation therewith in respective generally vertical parallel planes;

a plurality of shelves pivotally mounted for rotation about respective horizontal axes on said chains to define axially opposed shelf ends and for travel with said chains;

said chains and shelves together moving in a generally vertical conveying path between said sprockets in said front area, and further moving in a generally vertical return path between said sprockets in said rear area;

a first pair of rollers mounted on one axial end of each shelf respectively for rotation about parallel spaced apart horizontal axes;

a second pair of rollers mounted on the other axial end of each shelf respectively for rotation about parallel spaced apart horizontal axes;

for each shelf, a line connecting the axes of said first pair of rollers being generally perpendicular to the line connecting the axes of said second pair of rollers;

only a single first cam track having opposite terminal ends, being mounted on said frame adjacent said one axial end of said shelves, said first track generally following the path of said chains for only approximately one-half of the chains travel;

only a single second cam track having opposite terminal ends, being mounted on said frame adjacent said other axial end of said shelves, said second track generally following the path of said chains for only approximately one-half of the chains travel;

said first cam track being located within the front area of said frame, and said second cam track being located within the rear area of said frame; and

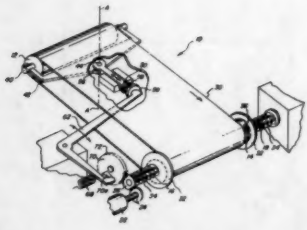
said first pair of rollers for each shelf engaging in said first cam track throughout the entire conveying path, and the second pair of rollers for each shelf engaging in said second cam track throughout the entire return path, so that said shelves are held in a horizontal position throughout said conveying path and in a vertical position throughout said return path.

4,421,228

PERIODICALLY ALIGNING AN ENDLESS WEB

Carl M. Marsiglio, Spencerport, and John P. Swapceinski, Bergen, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 17, 1981, Ser. No. 293,577
Int. Cl.³ B65G *23/44*
U.S. Cl. 198—814 **7 Claims**



1. Web-tracking apparatus, comprising:

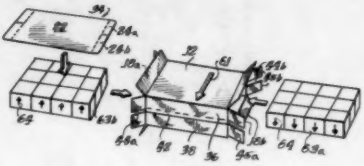
at least two web-engaging members for supporting an endless web and defining a path along which such web is movable, means for mounting one of said members to impart tension to the web; means cooperating with said tension imparting means for periodically reducing such tension; and means cooperating with said tension reducing means for laterally adjusting the position of the web relative to said members during intervals when web tension is reduced.

4,421,229

DOUBLE TRAY CASE

Peter N. Y. Pan, Minnetonka, and Gregory M. Fulkerson, Maple Plain, both of Minn., assignors to Paxall, Inc., Chicago, Ill.

Filed Jun. 29, 1981, Ser. No. 278,213
Int. Cl.³ B65D *5/50, 5/54*
U.S. Cl. 206—44 R **14 Claims**



1. A double-tray package comprising:

a top horizontal panel, a bottom horizontal panel and a pair of sidewalls each connected to said top and said bottom panels, one sidewall being horizontally separable and the other sidewall having a horizontal line of weakness extending the length thereof,

vertical upper end cover means and vertical lower end cover means at each end of said package defining an open horizontal slit entirely across each end of said package, and

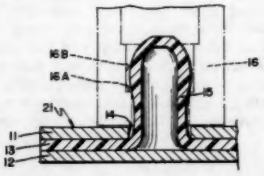
a central partition means having a transverse dimension substantially equal to the transverse dimension of said horizontal panels in order to fit between sidewalls and having glue flaps at each end thereof that extend through said horizontal slits and being folded vertically upward and secured to said upper end cover means and glue flaps at each end that extend through said horizontal slits being folded vertically downward and secured to said lower end cover means, said package having a first tier of product on one side of said central partition means and a second tier of product on the other side of said central partition means, whereby said package may be opened into a pair of joined trays by breaking said separable sidewall and detaching said lower end cover means from said glue flaps secured thereto.

4,421,230

PACKAGE FOR ARTICLES OF MANUFACTURE

Allyn K. Stanton, Chicago, Ill., assignor to Esco Corporation, Baltimore, Md.

Filed Jun. 22, 1982, Ser. No. 390,969
Int. Cl.³ B65D *85/20, 73/00*
U.S. Cl. 206—378 **7 Claims**



1. A multiple package for distribution and merchandising of wrench sockets, tool accessories, and the like, comprising a bonded laminated planar structure having a substantially rectangular plan outline and including a top layer, a bottom layer, and an intermediate layer, one of the top or bottom layers having a plurality of openings formed therein, the openings being spaced apart from one another and being arranged in respective columns and rows, the intermediate layer being formed from a plastic material and having a plurality of projec-

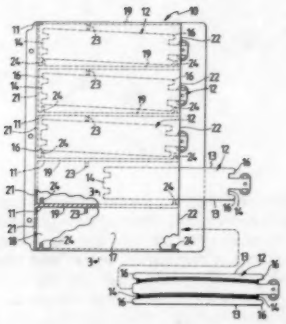
tions formed integrally therewith, the projections extending through the respective openings in the one layer, whereby the wrench sockets, tool accessories, and the like may be carried by the respective projections and retained by a slight interference fit, and the top and bottom layers being scored both longitudinally and transversely, intermediately of the projections and to a sufficient depth which extends partially into the intermediate plastic layer from at least one side thereof, whereby, as desired, an individual package may be cleanly broken off the multiple package by a "snap action".

4,421,231

DISPLAY AND STORAGE PACKAGE FOR AN ELONGATED FLAT ARTICLE

Ellen D. McCarn, Birmingham, Ala., assignor to McCarn Enterprises, Inc., Birmingham, Ala.

Filed Sep. 23, 1982, Ser. No. 421,881
Int. Cl.³ B65D *85/00*; B65H *54/46, 55/00*
U.S. Cl. 206—388 **4 Claims**



1. In a display and storage package for an elongated flat article having spaced apart longitudinally extending side edges extending generally parallel to each other and formed integrally with end edges with the point of juncture between adjacent side edges and end edges being rounded,

(a) at least one elongated, generally rectangular pocket-like member defined by superimposed flexible sheets of a width greater than the width of said elongated flat article and joined to each other along spaced apart longitudinal side edges and along one end edge with the other end of said pocket-like member being open for receiving said elongated flat article,

(b) an intermediate projection extending inwardly of said pocket-like member from one longitudinal side thereof at a location nearer said one end of said pocket-like member than said other end thereof, and

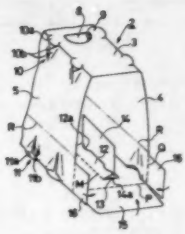
(c) longitudinally spaced end projections extending inwardly from the other longitudinal side of said pocket-like member at opposite sides of said intermediate projection and spaced from each other a distance substantially equal the distance between the points of juncture of said side edges with said end edges of said elongated flat article.

4,421,232

BOTTLE PACKAGING BOX

Yukio Konaka, Kanazawa, Japan, assignor to Shibuya Machine Company Ltd., Kanazawa, Japan

Filed Jan. 20, 1982, Ser. No. 341,029
Claims priority, application Japan, Aug. 5, 1981, 56-116401[U]
Int. Cl.³ B65D *75/08, 75/04, 71/00, 5/02*
U.S. Cl. 206—434 **5 Claims**



1. A packaging box assembled from a generally planar sheet material blank, wherein said blank comprises:

a plurality of fold lines dividing said blank into side, top, first and second bottom panels;

a plurality of openings in one of said bottom panels;

a plurality of insert tabs provided on the other of said bottom panels and being alignable for entry into said openings, each said insert tab having a generally trapezoidal shape and being connected to an edge of said other bottom panel about a further fold line, means defining a notch in opposite lateral edges of each said insert tab, each said opening in said one bottom panel having a lateral width less than the segment of said insert tab adjacent said further fold line; and

each said opening having means along one edge thereof defining a locking tab pivotal into and out of the plane of said one bottom panel, a folding of said blank about said fold lines effecting a placement of said other bottom panel beneath said one bottom panel so that an entry of an aligned said insert tab into a said opening will effect an upward deflection of said locking tab out of said plane of said one bottom panel, said notches receiving therein a lateral edge of each said opening, a downward urging of said locking tab caused by the weight of a container housed within said box effecting a tight locking of said insert tab into said opening.

4,421,233

ANTI-STATIC TRAY FOR SEMI-CONDUCTOR DEVICES AND COMPONENTS

Thomas R. Burnett, Ontario, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Aug. 16, 1982, Ser. No. 408,210
Int. Cl.³ B65D *21/02, 85/30, 81/02, 85/62*
U.S. Cl. 206—503 **1 Claim**

1. A stackable anti-static try for leaded semi-conductor devices and components, comprising:

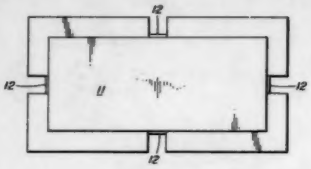
a rigid rectangular planar metal support member;

a layer of electrically conducting foam material bonded to an upper surface of said support member, for reception of leads of leaded devices and components;

a peripherally extending clear margin extending along the edges of the support member;

at least one downwardly extending leg on each side of said support member, said legs comprising sections severed from said clear margin and bent down out of the plane of

the support member, the legs having a length to provide a clearance between trays for the positioning of devices and



components on said foam material, and positioned to rest on said clear margin of a next lower tray.

4,421,234

CYLINDRICAL VESSEL WITH A BASE RING AND WITH A COUPLING DEVICE

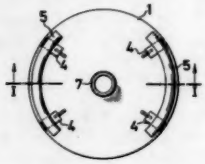
Robert Gärtner, Langen; Klaus-Dieter Maass, Eppstein, and Georg Senninger, Hattersheim am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Aug. 20, 1982, Ser. No. 409,945

Claims priority, application Fed. Rep. of Germany, Aug. 22, 1981, 3133316

Int. Cl.³ B65D *21/02*

U.S. Cl. 206—509 **6 Claims**



1. In a cylindrical vessel having a base and a head opposite the base, a base ring extending below its base, and a pair of oppositely-disposed support members extending upward from its head; the improvement wherein, to adapt the vessel to be lockably ganged to another like vessel, a bayonet fitting is provided including a pair of guide segments extending circumferentially on an inner side of the base ring and defining circumferential gaps between the guide segments, and a respective pair of ring segments extending radially outward from the respective support members to engage a like cylindrical vessel thereabove between its base and its guide segments.

4,421,235

OXYGEN ABSORBENT-CONTAINING BAG AND CONTAINER SEALING MEMBER HAVING THE SAME

Takehiko Moriya, Tokyo, Japan, assignor to Mitsubishi Gas Chemical Co. Inc., Tokyo, Japan

Continuation of Ser. No. 119,876, Feb. 8, 1980, abandoned. This application Oct. 21, 1981, Ser. No. 315,660

Claims priority, application Japan, Feb. 8, 1979, 54-15076; May 7, 1980, 55-60323

The portion of the term of this patent subsequent to Sep. 8, 1998, has been disclaimed.

Int. Cl.³ B65D *85/84*; A61B *17/06*

U.S. Cl. 206—524.2 **4 Claims**

1. A bag in which an oxygen absorbent is sealed, characterized in that at least part of the material constituting the bag is composed of a film having a plurality of fine openings in the

range of 0.01 to 45 microns, and being gas-permeable, but water-impermeable at one atmospheric pressure.

4,421,236

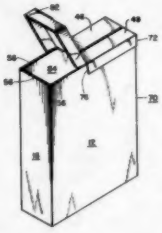
LINERLESS CARTON INCLUDING EASILY OPENABLE POURING SPOUT

Robert E. Lowe, Battle Creek, Mich., assignor to General Foods Corporation, White Plains, N.Y.

Filed Jul. 6, 1982, Ser. No. 395,760

Int. Cl.³ B65D *5/66, 5/10*

U.S. Cl. 206—621 **13 Claims**

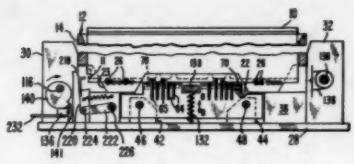


1. A carton providing for a recloseable pouring spout for a generally free-flowing bulk commodity or granular, powdered or flaked materials, said carton comprising side and end wall panels; extensions at one end of each of said panels forming bottom closing flaps for said carton, said flaps being inwardly foldable to constitute a carton bottom closure; and extensions at the other end of each of said panels forming top closing flaps for said cartons, said top flaps being inwardly foldable to form a carton top closure, said top closing flaps including outer and inner side flaps and end flaps adapted to underlie said side flaps, a plurality of fold lines being formed on each of said top closing flaps, said fold lines extending in predetermined parallel spaced relationship with the upper ends of said panels, said top closing flaps being foldable outwardly of said carton along said parallel spaced fold lines so as to form a depending flange extending about the upper peripheral edge portions of said panels and in surface contact with the outer surfaces of said panels, a tear line extending between the juncture of the upper edge of said panels and one said end flap and adjoining portions of each adjacent side flap, die cuts extending upwardly through said depending flanges at the ends of said tear line, and a fold line extending across the top closure between the other ends of said die cuts whereby upward pressure exerted on said last-mentioned end flap causes said tear line to sever and facilitate pivotal upward movement of the portion of the top closure encompassed by the tear line about said fold line so as to form said pouring spout, said pouring spout being recloseable responsive to downward pressure being exerted on said raised portion of the top closure and causing sealing engagement between the flange and the outer surfaces of said panels.

4,421,237
ELECTRO-MECHANICAL RETRIEVAL DEVICE FOR RANDOMLY FILED MATERIALS

Laurence A. Cross, Jr., Groveville, N.J., assignor to Randomatic Data Systems, Inc., Trenton, N.J.

Filed Aug. 10, 1981, Ser. No. 291,593
Int. Cl.³ B07C 5/36
U.S. Cl. 209—612 17 Claims



1. A device for retrieving randomly filed cards or the like, comprising:

(a) a support structure;

(b) a capsule removably insertable therein and adapted to receive a quantity of randomly filed cards having code notches in one edge thereof;

(c) a selector slide support block movably mounted in said structure and underlying the capsule;

(d) a plurality of selector slides mounted on said block for movement between retracted, reset positions and advanced, set positions;

(e) means for advancing selected ones of the slides, matching the code notches of a wanted card, to their set positions;

(f) means for vibrating the block;

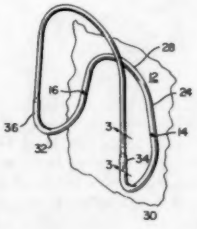
(g) means for ejecting a selected card; and

(h) means for returning to their reset postions those slides which have been advanced to set positions.

4,421,238
SADDLE RACK

Suzanne Patton, 8055 Buckingham Rd., Cincinnati, Ohio 45243

Filed Jun. 26, 1981, Ser. No. 277,987
Int. Cl.³ A47F 5/08
U.S. Cl. 211—87 10 Claims



1. A saddle rack for storing a saddle in a limited space, said rack comprising:

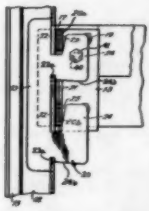
a U-shaped base member, said member having a first centrally disposed portion forming a first plane, said first centrally disposed portion having means for securly mounting said U-shaped base member to a planar surface, said centrally disposed first portion having two U-shaped hook like portions extending outwardly and away from said plane of said first centrally disposed portion, said two U-shaped hook like portions forming planes perpendicular to said plane of said first centrally disposed first portion, said two U-shaped hook like portions having end portions extending from each in a direction substantially parallel to said plane of said first centrally disposed portion of said base member and spaced therefrom; and

a U-shaped retainer member, said member being releaseably but securably connected to said end portion of said U-shaped hook portion of said base member, said retainer member forming a plane substantially parallel to said plane of said centrally disposed portion of said base member when releasably but securably connected to said U-shaped hook like portions of said base member, the closed portion of said U-shaped retainer member extending beyond the closed portion of said U-shaped centrally disposed portion of said base member, said U-shaped retainer member being substantially parallel to said U-shaped centrally disposed portion of said base member and spaced therefrom.

4,421,239
KEY FOR USE WITH KNOCK-DOWN SHELVING UNITS

William R. Vargo, Lithonia, Ga., assignor to Husky Systems of Georgia, Inc., Lithonia, Ga.

Continuation-in-part of Ser. No. 67,567, Aug. 17, 1979, abandoned. This application Dec. 18, 1981, Ser. No. 332,147
Int. Cl.³ A47F 5/00
U.S. Cl. 211—187 6 Claims



1. In a key for use with a knock-down shelving unit which unit is comprised of: a hollow vertical post of sheet metal material of generally rectangular cross-section and having at least a pair of vertically spaced, vertically extending slots along its length and horizontal beams having end plates with similarly spaced and extending slots to be assembled with the post; said key including an elongated shank having an edge of a length greater than the length of one of said slots and adapted to abut against a wall of said post, said key additionally having an upwardly opening hook portion extending from said edge and adapted to project through one of said slots and coact with, on the outside of said post, slots of said beams, said key being preassembled with said post before said horizontal beams are assembled therewith, the improvement which comprises: said hook portion having a lower side with a downwardly opening notch adjacent said edge, said notch having a base with a width slightly less than the thickness of said sheet material and a side slightly diverging from said edge, whereby said key can be easily secured to said post by the walls of said notch while said post is in a disassembled horizontal postion.

4,421,240
GOLF CLUB DISPLAY RACK

John F. Connolly, Schaumburg, Ill., assignor to Wittek Golf Range Supply Co., Ill.

Filed Aug. 3, 1981, Ser. No. 289,370
Int. Cl.³ A47F 7/00
U.S. Cl. 211—60 G 1 Claim

1. A display rack for a set of golf clubs comprising:

(a) a pair of substantially V-shaped mounting means, each of said means including a rear flat wall and inwardly-extending side and bottom walls, and an offset on said rear wall adjacent said side walls, one of said mounting means being larger than the other in area,

(b) a substantially horizontally-extending, V-shaped supporting structure having a top wall and side flanges, a bulbous portion extending inwardly from said top wall and medially of said side flanges, of substantially inverted V-shape having a substantially inverted V-shaped rear flange extending inwardly, said bulbous portion tapering on a radius from the rear flange forwardly and sidewardly in both directions to said top wall, a series of spaced, inwardly-extending depressions in said top wall adjacent one side of said bulbous portion to seat the grips of wooden golf clubs, a series of spaced, inwardly-extending depressions on the other side wall adjacent said bulbous portion in said top wall to receive the ends of the shank adjacent iron golf club heads to support the iron club heads above said depressions,

(c) a second substantially horizontally-extending, V-shaped supporting member larger than said first mentioned member having top walls with depending side walls, a bulbous portion extending upwardly from said top walls medially of said side walls, the rear end of said bulbous portion being substantially flat and of substantially inverted V-shaped and having downwardly and inwardly-extending flanges, said bulbous portion tapering radially on a radius from said rear flanges forwardly and sidewardly in both directions to said top walls, one of said top walls having a series of spaced, cylindrical depressions in said top wall to support the sole of wooden golf clubs, a radially-disposed depression in the other of said top walls to support the ends of the grips of iron golf clubs,

whereby, when said mounting means are anchored to a vertical surface in vertical spaced relationship, the substantially inverted V-shaped flanges on the rear of said bulbous portions of said supporting means will each be removably secured one in each of the offset portions in said mounting means to display golf clubs.

4,421,241

REMOVABLE LIVE MAST AND HOIST UNIT

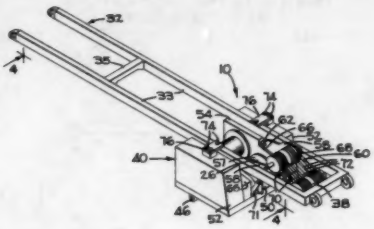
Leroy L. Wittman, Marion, and Lyle B. Jensen, Cedar Rapids, both of Iowa, assignors to FMC Corporation, Chicago, Ill.

Filed Apr. 24, 1981, Ser. No. 257,067

Int. Cl.³ B66C *23/26, 1/12*

U.S. Cl. 212—186 **4 Claims**

1. A removable live mast and boom hoist unit for a crane of the type wherein pivotal movement of the mast causes similar pivotal movement of the crane boom, comprising: a generally U-shaped live mast having a closed end and an open end releasably connected to the crane and to the boom; a bridle journaled on the mast; a boom hoist and counterweight frame releasably connected to the crane and having a cavity therein; a power drive boom winch secured to the frame in the cavity and including a rotatable drum; a bail assembly pivoted to said frame for pivotal movement about a transverse axis and having a bail journaled for rotation thereon and adapted to swing about said axis along an arc of constant radius; reeving trained around said drum, bail, and bridle and disposed between said mast and frame when in an operative boom supporting position; said winch being effective to maintain tension on said bail and pivot a portion of said mast into engagement with said frame with said closed end extending beyond said frame when said mast and boom are disconnected; and means for rigidly



securing said mast to said frame with said winch, bail assembly, drum and reeving encircled by said frame and said closed end of said mast; said mast and frame along with the components supported thereon being removable as a unitary structure from the crane when released therefrom.

4,421,242

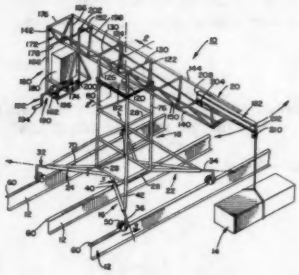
PANEL LOCATOR

Ralph H. Brueske, Kansas City, Mo., assignor to Butler Manufacturing Company, Kansas City, Mo.

Continuation-in-part of Ser. No. 131,871, Mar. 19, 1980, abandoned. This application Mar. 2, 1982, Ser. No. 353,874

Int. Cl.³ E04D *15/00*; B61D *1/00*; B66C *23/02*

U.S. Cl. 212—218 **16 Claims**



1. A knockdown panel locator comprising:

a base section which includes wheels rollably mounted on said base for rolling on roof purlins in a first direction and mounting legs mounting said wheels on said base;

transfer tracks extending in a second direction, means for attaching said transfer tracks to said purlins, direction change means for changing the direction of said wheels from said first direction to said second direction to permit movement of said panel locator along said transfer tracks, jack means for elevating said wheels to facilitate movement between said purlins and transfer tracks

a tower section mounted on said base and extending upwardly therefrom;

a boom section rotatably mounted on said tower section to be elevated above a roof, said boom section including an elongated body having a cage at one end thereof and a panel bundle supporting means on another end thereof;

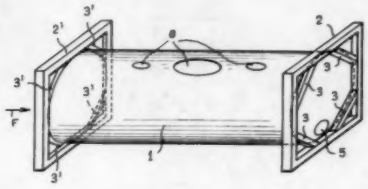
leveling means for maintaining the panel locator level on a sloping roof; and

lifting means on said boom section for lifting panel bundles off a roof.

4,421,243
CONTAINER, PARTICULARLY FOR MATERIALS IN PARTICLES

Jean-Pierre Taquoi, Soissons, France, assignor to B S L (Bignier Schmid-Laurent), Ivry s. Seine, France

Continuation of Ser. No. 153,139, May 27, 1980, abandoned.
This application May 4, 1982, Ser. No. 374,914
Claims priority, application France, May 29, 1979, 79 13603
Int. Cl.³ B65D *88/06, 88/12, 90/12*
U.S. Cl. 220—1.5 1 Claim

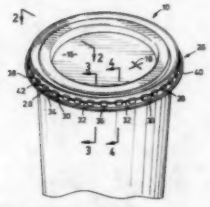


1. A self-supporting container unit comprising a cylindrical metallic vessel extending between two spaced apart metallic frames, each of said frames having four sides in rectangular configuration, adjacent sides of the frames being connected by ribs with each of the ribs at respective ends thereof being secured to two corresponding said adjacent sides, said vessel being supported by said frames and ribs and being welded to said frames and ribs at the respective end edges of the vessel, said vessel being defined by a cylindrical side wall and end walls welded to the interior side wall and spaced from said end edges, characterized in that the end edges of the side wall are in direct longitudinal abutment against said frames and ribs.

4,421,244
PLASTIC LID FOR CONTAINERS

Hubert Van Melle, Etobicoke, Canada, assignor to Amhil Enterprises Ltd., Mississauga, Canada

Filed Sep. 8, 1981, Ser. No. 300,371
Int. Cl.³ B65D *41/18, 43/03, 43/10*
U.S. Cl. 220—306 8 Claims

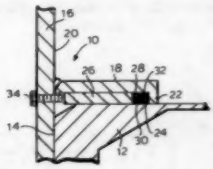


1. A lid for containers, made of thin, flexible plastic, for mounting on and receiving the bead of a container, comprising:
a central panel;
a cavity extending around the periphery of the lid and opening downwardly and inwardly to receive the bead of a container to which said lid is fitted;
means connecting said cavity to said central panel;
a skirt portion extending downwardly from said cavity;
said skirt portion having a plurality of outwardly extending projections, each having a substantially vertical face with substantially vertical side edges, and substantially vertical side walls extending inwardly from said face;
the portions of said skirt that are between said outwardly extending projections extending inwardly to a waist portion hving a plurality of interruptions, one at each projection, and forming an undercut defining said cavity in said waist portion;
said outwardly extending projections and said waist portion all terminating in their lower extremities at a downwardly and outwardly sloped lower band portion;
and said outwardly extending projections terminating in their upper extremities at a respective upper, band portion extending inwardly and upwardly from the upper edge of each said respective vertical face and terminating at said cavity in an upper undercut which is higher and less inwardly extending than the undercut of said waist portion, and which defines the peripheral cavity over said outwardly extending projections.

4,421,245
CLOSURE ASSEMBLY

Steven R. Massey, Olathe, Kans., assignor to Gulf & Western Manufacturing Company, Southfield, Mich.

Filed Feb. 4, 1983, Ser. No. 463,775
Int. Cl.³ B65D *45/00*
U.S. Cl. 220—328 7 Claims



1. A closure assembly comprising:
a cover member having an outer surface and an inner surface;
a substantially cylindrical retaining member projecting from said inner surface of said cover member;
a circumferential flange extending radially with respect to said retaining member;
a substantially cylindrical crush ring positioned adjacent to and coaxial with said retaining member, said crush ring being slidable with respect to said retaining member and having an end in opposing relation to said circumferential flange;
a sealing ring positioned between said end of said crush ring and said circumferential flange; and
tightening means extending through said cover member and capable of moving said crush ring towards said circumferential flange thereby compressing said sealing ring.

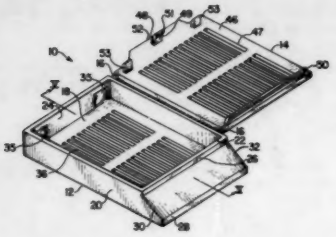
4,421,246
BIOLOGICAL TISSUE CASSETTE

Ronald W. Schultz, and Donald R. Graham, both of Pittsburgh, Pa., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Jun. 21, 1982, Ser. No. 390,301
Int. Cl.³ B65D *39/00, 41/13*
U.S. Cl. 220—307 21 Claims

1. A tissue cassette comprising:
(a) an open-topped, perforated base member adapted to receive a tissue specimen,

(b) a perforated lid member adapted to cover the base member and be secured thereto in a closed position, and



(c) one or more gates joining the lid member to the base member in an open position wherein said gates will break when flexed.

4,421,247

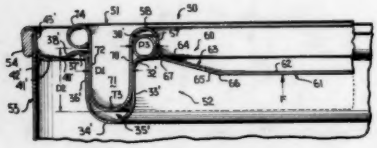
TWO-PIECE QUAD-SEAL CLOSURE WITH PLUG SHOCK ABSORBING END PANEL

Paul Lombardo, Dolton; Leon Patarini, Palos Hills, and James Imlah, Elmhurst, all of Ill., assignors to The Sherwin-Williams Company, Cleveland, Ohio

Filed May 3, 1982, Ser. No. 374,464

Int. Cl.³ B65D *43/06*

U.S. Cl. 220—354 **21 Claims**



1. A two-piece shock absorbing closure for use with a container comprising a ring and a plug, said plug including a central generally circular unreinforced concavely axially outwardly opening end panel, an annular axially projecting plug portion bounding said end panel, said ring including an axially opening annular channel adapted to receive said plug portion, said annular channel being defined by inner and outer channel walls and a bight wall therebetween, means radially outboard of said outer channel wall responsive to insertion of said plug portion into said annular channel for radially inwardly deflecting said outer channel wall to bring the same into intimate friction engagement with said plug portion, and wall means between said end panel and said plug portion for effecting the deflection of said end panel from its concave configuration to a convex configuration in response to shock forces imparted to said closure and/or its associated container thereby absorbing such shock forces to prevent plug popping.

4,421,248

SECURITY APPARATUS AND METHOD FOR A SELF-SERVICE FUEL PUMPING STATION

John R. Porcina, 11799 Lyon Rd., Delta, British Columbia, Canada

Filed Jun. 15, 1981, Ser. No. 273,671

Int. Cl.³ B67D *5/30*

U.S. Cl. 222—25 **13 Claims**

1. An apparatus adapted to deliver fluid, such as liquid fuel, at a self-service station where there is a record made of fluid delivered, said apparatus comprising:

(a) a pump to pump fluid from a fluid source;

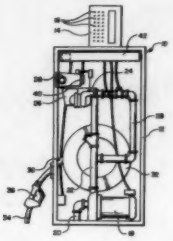
(b) a nozzle means to receive fluid from said pump;

(c) selectively operable switch means to cause said pump to operate;

(d) counting means responsive to fluid flow and operable to record the same;

(e) flow detecting means to detect fluid flow to said nozzle;

(f) shut off control means operatively connected to said flow detecting means and to said counting means to detect a condition where said flow detecting means detects flow to



said nozzle and said counting means is not operating to record flow, and to shut off fluid flow to said nozzle upon occurrence of said condition, said shut off control means comprising timing means to initiate a timing cycle and to detect a time interval extending from a beginning of fluid flow to operation of said counting means, with said shut off means shutting off fluid flow where said time interval exceeds said timing cycle.

4,421,249

APPARATUS FOR DISPENSING FLUIDS

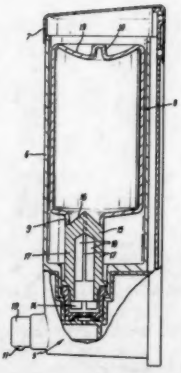
Audley B. Williamson; Stewart Banks, and Francis J. Rice, all of Derby, England, assignors to Appor Limited, Derby, England

Filed Mar. 31, 1981, Ser. No. 249,325

Claims priority, application United Kingdom, Apr. 2, 1980, 8011066

Int. Cl.³ B67B *7/28*

U.S. Cl. 222—88 **6 Claims**



1. A dispenser comprising a hollow body defining an internal cavity in which a container of product to be dispensed can be removably located, a dispensing mechanism disposed below the hollow body, and means within the body for puncturing a container of product inserted therein so as to form an outlet for discharge of product from the container via the puncturing means to the dispensing mechanism, wherein the puncturing means also defines the path for passage of product between the

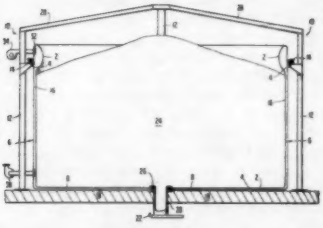
puncturing means and the lower portion of said cavity to form a reservoir of product of predetermined capacity in the latter, said means for puncturing the container comprising an upwardly directed projection having a point for piercing the container, the projection being hollow and openings being provided to define said path which permits product released from the container following puncturing to pass into the lower portion of the cavity, and the container being supported within the cavity by the projection, a lower portion of the hollow body being formed so as to enable viewing of said product forming said reservoir in said lower portion of said cavity from externally of the dispenser, said path enabling product to be supplied to said dispensing mechanism from said reservoir when said container is empty of product, the capacity of the reservoir enabling removal and replacement of the container before the product is exhausted from the dispenser.

4,421,250

BIN FOR FREE FLOWING MATERIAL

Timothy C. Bonerb, and Vincent C. Bonerb, both of P.O. Box 1997, Buffalo, N.Y. 14219

Filed Apr. 27, 1981, Ser. No. 257,604
Int. Cl.³ B65D *88/62*
U.S. Cl. 222—95 **5 Claims**



1. A bin for free flowing granular material having a bottom resting on a support member and sides extending upwardly from said bottom, the bin comprising:

(a) a generally cup-shaped, open top, double walled, flexible bag having an inner membrane and an outer membrane, both of impervious material, forming the double wall;

(b) framework means for suspending the bag in an open position without providing any lateral support for the outer membrane of the bag, the top of the bag forming the top of the bin;

(c) clamp means carried by the framework means for clamping the bag adjacent the top edge thereof to thereby support and hang the side walls of the membrane vertically so as to provide side walls without lateral support;

(d) a closable discharge port in the bottom of said bin extending through said inner membrane and said outer membrane and engaging said inner membrane and said outer membrane to form a substantially air tight space between said inner membrane and said outer membrane said closable discharge port allowing the free flowing granular material to drain from the bin for emptying the same down to the angle of repose of the free flowing granular material when the closable discharge part is opened, thereby creating a void of inverted conical shape within the original mass of the granular free flowing material with the apex of the inverted conical shape at the closable discharge port; and

(e) air inlet and outlet passages through which air is forced or withdrawn between the inner membrane and the outer membrane;

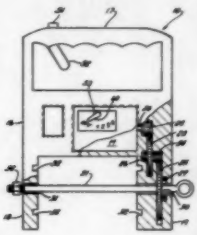
(f) means to inflate the closed bag with fluid under controlled pressure so that the bag will expand against the top edge the granular free flowing material remaining after creating the void of inverted conical shape void to force this material into the void and hence down the closable discharge opening, so that the bag will continue to expand downwardly and inwardly until all of the granular free flowing material is gradually forced into the inverted conical shaped void and out of the closable discharge port.

4,421,251

MOTORIZED APPARATUS FOR DISPENSING CAKE ICING

Bahram Namdari, and Kathleen D. Namdari, both of P.O. Box 17366, Milwaukee, Wis. 53217

Filed Oct. 1, 1981, Ser. No. 307,186
Int. Cl.³ B65D *35/28*
U.S. Cl. 222—99 **16 Claims**



1. Apparatus for dispensing a substance such as cake icing or the like from a collapsible container having a nozzle thereon comprising:

a hand-holdable power unit including an electric motor;

a cartridge detachably connectable to said power unit, said cartridge including a rotatable member adapted to be rotatably driven by said motor when said cartridge is connected to said power unit; and

means for connecting said container to said rotatable member so that said substance is extruded from said nozzle when said member rotates, said container is wound on said rotatable member as the latter rotates and spaced-apart extrusion members on either said power unit or said cartridge between which said container is extendable and against which said container is drawn by said rotatable member to effect extrusion of said substance from said nozzle.

4,421,252

TOOTHPASTE DISPENSING DEVICE

Howard M. Ylitalo, Rte. 2, Box 101, Cokato, Minn. 55321

Filed Jan. 11, 1982, Ser. No. 338,260
Int. Cl.³ B65D *35/28*
U.S. Cl. 222—102 **5 Claims**

2. A toothpaste dispensing device, having in combination

a mounting back plate member,

an overlying top plate member spaced from said mounting plate member,

adjustable means spacing said plate members,

said mounting plate member having a pair of side ledges,

dispensing means disposed between said plate members, comprising

a pair of opposed upstanding side plate members extending longitudinally of and being carried by said mounting plate and respectively engaging said ledges,

a plurality of resilient rollers journaled between said side plate members in a triangular relationship,

said rollers having frictional contact with one another,

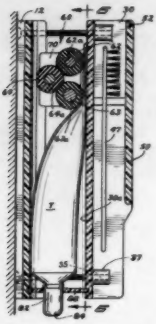
one of said rollers having a shaft extending outwardly of at least one of said side ledges,

manual means secured to said outwardly extending shaft rotating said rollers,

at least one of said rollers being adjacent said top plate

adapted to have the end portion of a tube of toothpaste engaged therebetween,

plate means disposable at the front end portions of said plate members engaging



a dispensing cap carried by said last mentioned means adapted to be secured to the dispensing outlet of said tube, and

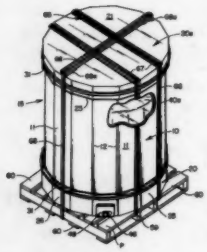
said cap having flexible slit outlet portions.

4,421,253

DISPOSABLE CONTAINER ASSEMBLY FOR LIQUIDS OR SEMI-LIQUIDS IN BULK

Thomas E. Croley, Worthington, Ohio, assignor to Willamette Industries, Inc., Delaware, Ohio

Filed Feb. 17, 1982, Ser. No. 349,696
Int. Cl.³ B65D *35/14*
U.S. Cl. 222—105 **25 Claims**



1. A container and support assembly including:

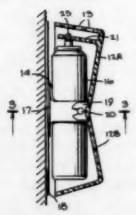
a disposable fiberboard assembly comprising a tubular body of fiberboard or the like composed of a plurality of vertical panels hinged together at vertical hinge joints to form a multi-sided polygonal body of tubular form open at both its upper and lower ends which is set up from a blank folded flat at opposed hinge joints, a bottom tray of fiberboard or the like with upstanding flanges hinged to a flat disc-like bottom wall which has an outer polygonal periphery corresponding substantially to that of the tubular body and with flanges hinged thereto at horizontal hinge joints and being set-up from a flat blank with the flanges turned upwardly from the disc-like bottom, a surrounding tie-band securing the flanges in upstanding position, said tubular body being telescoped downwardly into the tray with its vertical panels within the corresponding upstanding flanges of the bottom tray and having its lower end resting on the bottom disc-like wall of the tray, a pallet on which said tray disc-like bottom wall rests, a cap of fiberboard or the like with depending flanges hinged to a disc-like top wall which has an outerpolygonal periphery corresponding substantially to that of the tubular body and with flanges hinged thereto at horizontal hinge joints and being set-up from a flat blank with the flanges turned downwardly, a surrounding tie-band securing the flanges in depending position, said cap being telescoped downwardly over the upper end of the tubular body with its depending flanges overlapping the corresponding vertical panels of the body and with its disc-like top wall resting on the upper end of the body; and stabilizing means for securing the fiberboard assembly to the pallet comprising tension members at angularly-spaced positions around the tubular fiberboard container body extending completely vertically around the cap and along the vertical panels of the body and tightened and secured to the pallet to clamp these members axially together; said tubular body having flanges at its lower end hinged to the corresponding panels at horizontal hinge joints and turned inwardly horizontally so they will rest on said disc-like bottom wall of the tray; said stabilizing means also including an upper stabilizing frame in contact with the flat disc-like top wall of the cap, said frame including frame members disposed in angular relationship across said flat top wall of the cap to provide outwardly-extending arms which extend to the edge of the cap, said pallet being of a size to extend to the edge of the tray, said pallet having an upper support surface and spaces therebeneath, said tension members extending vertically completely around the stabilizing frame along the arms thereof and beneath the support surface of the pallet and through the said spaces thereof; said arm-forming frame members comprising a pair of laterally-spaced parallel slats extending across the top wall of the cap and disposed just laterally outwardly of opposed depending flanges thereof, and a single slat disposed at right angles to the pair of slats and extending across the top wall of the cap so that it is intermediate the opposing depending flanges thereof, a single tension member extending over the latter slat and vertically along the corresponding opposed panels of the body as well as beneath the pallet, and a pair of tension members extending over the first-mentioned pair of slats and extending vertically just laterally outwardly of the hinge joints of the opposed panels of the body and beneath the pallet.

4,421,254

WALL-MOUNTED AROMATIC LIQUID DISPENSER ASSEMBLY

Donald Spector, 380 Mountain Rd., Union City, N.J. 07087

Continuation-in-part of Ser. No. 107,625, Dec. 27, 1979, Pat. No. 4,309,011. This application Nov. 17, 1981, Ser. No. 322,086
Int. Cl.³ B05B *15/00*
U.S. Cl. 222—180 **7 Claims**



1. A wall-mountable aromatic liquid dispenser assembly comprising:

A. a spray can containing an aromatic liquid and provided at its upper end with an upright actuating pin which when depressed axially acts to spray the liquid upwardly;

B. a fixture having a flat base attachable to a wall and a yoke

mounted on the base and embracing the can to hold it in an upright position;

C. a single piece cover plate provided with oppositely-inclined upper and lower sections in a rocker formation simulating the appearance of a standard electric toggle switch, the plate being pivotally mounted on the fixture on an axis parallel to the junction line between the sections and covering and concealing the fixture and the can, said plate having vents therein above said actuating pin; and

D. means operatively linking the cover plate and the pin whereby when the plate is rocked the pin is depressed to discharge the resultant spray through the openings, said means being constituted by a link member cantilevered from the inner wall of the upper section, the free end of the member having a slot therein through which the pin projects.

4,421,255

DISPENSER FOR PASTY PRODUCTS

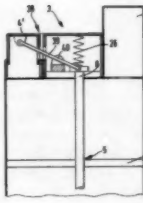
Joachim Czech, Jahnstrasse 19, D-8405 Donaustauf, Fed. Rep. of Germany

Filed Oct. 31, 1980, Ser. No. 202,725

Claims priority, application Fed. Rep. of Germany, Nov. 9, 1979, 2945338

Int. Cl.³ B67D *5/42*

U.S. Cl. 222—387 **2 Claims**



1. A dispensing container for viscous materials comprising: a hollow body that has a side wall and an end wall, a piston which cooperates with said body to define a chamber and which is slidable in one direction in said body in contact with said side wall to force viscous materials in said chamber out of the same through a dispensing outlet in a part of said body, a manually movable actuator located at the end of said body nearest side end wall and accessible at the exterior of said body for manual actuation in a direction against a bias in an opposition direction, an axially movable rod which extends through said end wall, a lever forming a connection between said actuator and said rod that constrains said rod to move in unison with but in an opposite direction from said actuator, whereby actuation of said actuator in said opposite direction imparts motion to said rod in said one direction, motion transmitting means providing a unidirectional driving connection betwee said rod and said piston whereby said rod is allowed to move relative to said piston in a direction opposite to said one direction, but said piston is constrained to move with said rod in said one direction, and a check valve operatively associated with said dispensing outlet and arranged to permit flow of viscous material out of said chamber but to block flow of air into said chamber so that atmospheric pressure confines said piston against motion in said opposite direction relative to said body.

4,421,256

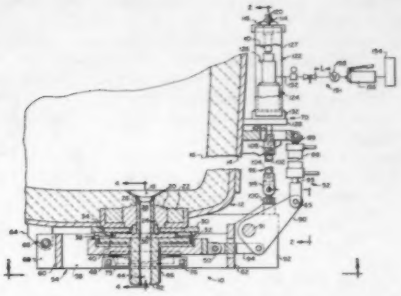
SLIDING GATE VALVE HAVING ADJUSTABLE SEAL PRESSURE

Eugene V. Abarotin, Franklin Township, Westmoreland County, and Leroy V. Bonk, Pittsburgh, both of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed Oct. 2, 1981, Ser. No. 307,834

Int. Cl.³ B22D *41/08*

U.S. Cl. 222—600 **11 Claims**



10. A sliding gate valve apparatus for controlling the flow of molten material from the outlet of a teeming vessel comprising:

(a) a carrier support having rectangularly arranged walls positioned beneath said outlet and having one end pivotally connected to said vessel;

(b) a gate carrier containing a refractory plate having a flow control opening cooperable with said vessel outlet mounted in said carrier support;

(c) slide guides along the side walls of said carrier support having bearing surfaces for sliding engagement with surfaces on said gate carrier that mate with said slide guide bearing surfaces;

(d) means on said side walls for mounting said slide guides for pivotal movement about axes normal to said side walls;

(e) said bearing surfaces being formed as segments of a cylinder about an axis parallel with said frame side wall.

4,421,257

METAL POURING NOZZLE WITH GAS INLET

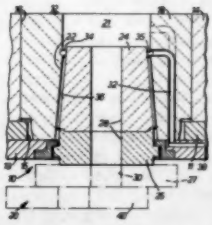
Anthony Thrower, Woodhouse, near Sheffield, England, assignor to USS Engineers and Consultants, Inc., Pittsburgh, Pa.

Filed Jan. 29, 1982, Ser. No. 344,092

Claims priority, application United Kingdom, Feb. 12, 1981, 8104359

Int. Cl.³ B22D *41/08*

U.S. Cl. 222—600 **6 Claims**



1. In combination, a molten metal teeming vessel having a bottom pour opening and a sliding gate valve containing relatively movable apertured plates attached to said vessel about

said pour opening to control the flow of metal from said vessel, said vessel pour opening being defined by a wellblock positioned in the bottom of said vessel and having an axial bore therethrough, an internal nozzle having an axial flow opening for communication with the apertures of said sliding gate valve plates, said flow opening being of less diameter than that of said wellblock bore, said internal nozzle being disposed in the lower portion of said wellblock bore and having its upper end surface open to and axially spaced from the upper end of said wellblock bore, and means for injecting gas into said wellblock bore comprising:

(a) an annular space between the upper portion of said internal nozzle and the wall of said wellblock bore,

(b) a gas supply conduit leading into and through said wellblock and having its discharge end opening into said annular space below but adjacent the upper end of said internal nozzle; and

(c) means between the wall of said internal nozzle and the wall of said wellblock bore to prevent the flow of gas downwardly from said annular space.

4,421,258

PANTY HOSE SIZING FORM

Sam C. Safrit, Pfafftown, and William B. Cothran, Burlington, both of N.C., assignors to Kayser-Roth Hosiery, Inc., Burlington, N.C.

Filed Mar. 15, 1982, Ser. No. 358,031
Int. Cl.³ D06H 3/16
U.S. Cl. 223—75 **8 Claims**

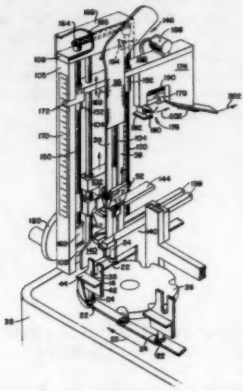
1. A panty hose sizing form comprising a pair of spaced-apart and identically shaped flat elongate boards, each of said boards including a rounded free end adapted to be engaged by the toe of a panty hose, an opposite end portion adapted to be engaged by the panty portion of the panty hose, means interconnecting and maintaining said boards with their flat sides facing each other and with said opposite end portions of said boards in said spaced-apart relationship, and opposite side edges of said boards being contoured symmetrically, relative to the longitudinal axis of said boards, so that the panty hose can be easily drawn onto and removed from said sizing form, said boards including a foot portion adjacent said free end, a calf portion adjacent said foot portion, a thigh portion adjacent said calf portion, and a lower body portion adjacent said thigh portion, and the transverse width of said boards progressively increasing from the free end to a medial portion of said body portion and then progressively reducing in width throughout the remaining portion of said lower body portion so as to define outwardly bulging portions along opposite sides of said body portion.

4,421,259

METHOD AND APPARATUS FOR HANDLING HOSIERY

James H. Sewell, Charlotte, N.C.; Hans Gaede, Fort Mill, S.C., and Curtis R. Ritch, High Point, N.C., assignors to Intech Corporation, Charlotte, N.C.

Filed Apr. 3, 1981, Ser. No. 250,636
Int. Cl.³ D06C 5/00
U.S. Cl. 223—76 **39 Claims**



1. An apparatus for handling hosiery and the like during processing comprising:

a form dimensioned to be inserted into hosiery and supported for motion to carry the hosiery during processing;

clamp means carried with said form, said clamp means being movable upward and downward along the length of said form and between a closed position to secure hosiery to said form and an open position;

mechanical means discrete from said form for raising said clamp means to a desired height; and

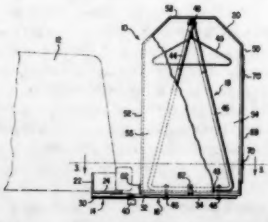
mechanical clamp actuating means for moving said clamp means between its open and closed positions, said mechanical clamp actuating means being correlated with said mechanical clamp raising means to move said clamp means to its closed position after said clamp means has contacted a bottom of hosiery placed on said form and moved the bottom of the hosiery upward a distance.

4,421,260

PORTABLE CLOTHES CLOSET

Robert E. DeVore, Rte. 1, Box 451, Picayune, Miss. 39466

Filed Jun. 2, 1981, Ser. No. 269,738
Int. Cl.³ B60R 9/06
U.S. Cl. 224—42.43 **4 Claims**



1. A portable apparatus for storing and transporting clothes comprising:

a waterproof enclosure comprising a bottom, a top, two

upstanding walls, a rear, and a front, said front having an opening and a door for sealingly covering said opening,

a bar extending between upper parts of said upstanding walls adapted to receive clothes hangers, and

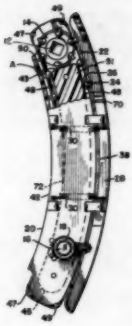
means on said enclosure for cooperating with means on a vehicle for removably attaching said enclosure to the exterior of a vehicle so that said enclosure may be easily detached from said vehicle and for orienting said enclosure in a position wherein said bar is horizontal and above said bottom and wherein said hangers hang downwardly from said bar.

4,421,261

WEB FEED TRACTOR

Leo J. Hubbard, Somerset, Mass., assignor to Precision Handling Devices, Inc., Assonet, Mass.

Filed Jan. 16, 1981, Ser. No. 225,586
Int. Cl.³ B65H *17/38*
U.S. Cl. 226—74 **10 Claims**



1. A tractor for feeding perforated webs comprising an endless belt having pins projecting outwardly and drive elements projecting inwardly thereof, a frame of concavo-convex, oblong shape having a pair of juxtaposed side plates, said frame being convexly curved and concavely curved along opposite surfaces thereof, an outwardly open, convexly curved slot defined by said side plates along said convexly curved surface, a concavely curved slot defined by said side plates along said concavely curved surface, said concavely curved slot being at least partially cloked, at least one sprocket journalled in said side plates, said belt being disposed between said side plates and around said sprocket with a plurality of said drive elements engaged with said sprocket and with one reach of said belt in said convexly curved slot and guided thereby along a convexly curved path, and the reach of said belt opposite to said one reach being disposed within said concavely curved slot and guided therein along a concavely curved path.

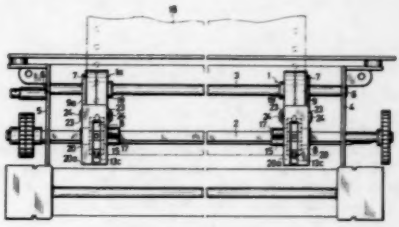
4,421,262

PAPER TRACTOR

Yoshinori Chida, and Satoru Tada, both of Tokyo, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan

Filed Jan. 2, 1981, Ser. No. 221,978
Claims priority, application Japan, Jan. 22, 1980, 55-6201; Jan. 22, 1980, 55-6202
Int. Cl.³ B65H *17/38*; G03B *1/24*
U.S. Cl. 226—79 **3 Claims**

1. In a paper tractor for use in feeding recording paper of different widths in printers or the like, the combination comprising: a rotary drive shaft having a polygonal cross-section; a sprocket wheel having a set of sprockets for engaging in perforations in the recording paper in response to rotation of the sprocket wheel and having two tubular sleeves extending outwardly from opposite lateral portions of said sprocket wheel and having a center bore shaped to non-rotationally receive therein said drive shaft and through which slidably extends said drive shaft, at least one of said sleeves having a set of spaced slots extending axially along the sleeve to cause the sleeve to resiliently and frictionally engage said drive shaft with a frictional force-fit effective to maintain the sprocket wheel in a predetermined axial position on the drive shaft during use of the paper tractor and effective to enable manual sliding movement of the sprocket wheel on the drive shaft against the resistance offered by the frictional force-fit to adjust the axial position of the sprocket wheel to accommodate recording paper of different widths; a stationary shaft disposed



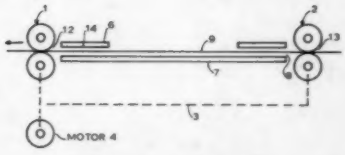
in spaced apart and parallel relationship with respect to said rotary drive shaft; a paper cover having a tubular portion turnably and slidably received on said stationary shaft thereby mounting said paper cover for turning movement on said stationary shaft between opening and closing positions relative to said sprocket wheel, said paper cover including a retainer plate effective to cover the upper part of said sprocket wheel; and a frame on which is turnably disposed said tubular portion and having a pair of side arms configured to embrace said sprocket wheel from opposite sides of the latter, said side arms having substantially U-shaped bearing bores rotatably receiving respective ones of said sleeves of the sprocket wheel.

4,421,263

BI-DIRECTIONAL CLUTCHLESS FILM TRANSPORT DEVICE

Harry J. Halewijn, Manchester, Mass., assignor to Itek Corporation, Lexington, Mass.

Filed Mar. 4, 1982, Ser. No. 354,821
Int. Cl.³ B65H *17/26, 17/22*
U.S. Cl. 226—143 **28 Claims**



1. Film transport device comprising:

first antibuckling means for pushing against at least a portion of one surface of said film when said film tends to buckle;

second antibuckling means for pushing against at least a portion of the opposite surface of said film when said film tends to buckle;

positioning means for providing a separation gap between said first and second antibuckling means less than about 40 mils;

a first pair of film drive rollers having sufficient compliance

to permit slippage of said film with respect to said first pair of drive rollers;

a second pair of film drive rollers having sufficient compliance to permit slippage of said film with respect to said second pair of drive rollers;

drive means for producing bi-directional rotation of said first and second pairs of drive rollers at the same angular velocity; and,

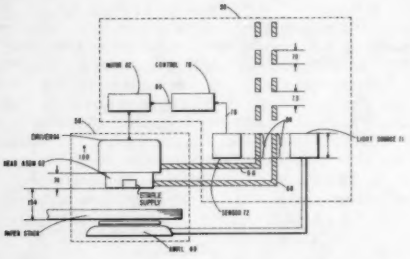
means for positioning the bytes of said first and second pairs of drive rollers adjacent said first and second antibuckling means adjacent the gaps thereof.

4,421,264

VARIABLE THICKNESS SET COMPENSATION FOR STAPLER

Nelson K. Arter, Longmont; Michael A. Bartholet, Boulder; Roger D. Emeigh, and Marion J. Herman, both of Longmont, all of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 26, 1981, Ser. No. 277,575
Int. Cl.³ B27F 7/17; G03G 15/00
U.S. Cl. 227—2 **11 Claims**



1. In a stapling device having an anvil means for accumulating and supporting a stack of sheets and head means and coacting driver means for driving a staple into the stack, the improvement comprising:

sensor means coupled to the head means and the driver means for supplying control signals representative of relative motion therebetween; and

controller means responsive to said control signals for driving the head means and driver means bidirectionally with variable force.

4,421,265

WAVE-SOLDERING A MEMBER TO AN ARTICLE

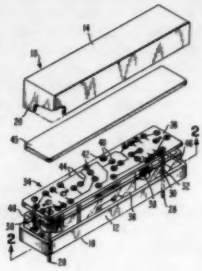
Albert E. Boyer, Peabody; John T. Callahan, Nahant, and Peter P. Filocamo, Methuen, all of Mass., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Apr. 10, 1981, Ser. No. 252,766
Int. Cl.³ B23K 1/08
U.S. Cl. 228—180 R **19 Claims**

1. A method of soldering a peripheral edge of a cover member to an article, which comprises:

assembling the cover member to the article with opposite side peripheral edge portions of the cover member adjacent respective opposite side portions of the article; and

passing the assembled cover member and article over a solder wave such that the opposite side peripheral edge portions of the cover member engage the solder wave



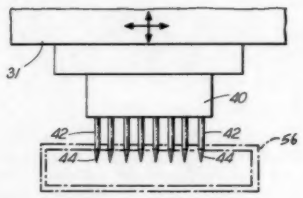
simultaneously to solder the opposite peripheral edge portions of the cover member to the article.

4,421,266

HANDLING BODIES CONTAINING BONDING MATERIAL

Anne B. Bock, Kutztown, Pa., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Jul. 29, 1981, Ser. No. 287,971
Int. Cl.³ B23K 1/12; H05K 1/04
U.S. Cl. 228—180 A **17 Claims**



1. Apparatus for substantially simultaneously applying respective ones of bodies containing bonding material to each of an array of bonding sites comprising:

means for holding the bodies in an array corresponding to the array of bonding sites;

means for holding an array of pickup pins having pickup ends adapted to frictionally engage the bodies and such array having such pickup ends correspond to the arrays of bodies and sites; and

means for manipulating the array of pins in steps, to substantially simultaneously, frictionally engage each of the bodies with a corresponding pickup end of a pin, to substantially simultaneously contact each of the bodies to a corresponding bonding site and to substantially simultaneously disengage the pins from the bodies.

4,421,267

SELF-LOCKING CONTAINER

Donald F. Wischoff, Fulton, N.Y., assignor to Container Corporation of America, Chicago, Ill.

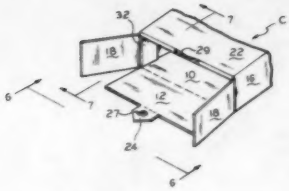
Filed Dec. 21, 1982, Ser. No. 451,807
Int. Cl.³ B65D 5/66
U.S. Cl. 229—44 R **3 Claims**

1. A self locking container formed from a unitary blank of foldable sheet material, such as paperboard, comprising:

(a) pairs of opposed major and minor side wall panels foldably joined to each other to form a tubular body open at the ends;

(b) top and bottom end closure flaps joined to end edges of said side wall panels for closing the ends of said tubular body;

(c) an integral locking structure for maintaining said container in assembled, erected condition without requiring outside securing means, said locking structure including:



(i) a retaining panel foldably joined at one edge to an upper end edge of one of said major side wall panels and folded 180° to lie in face-to-face relation with an inner surface of said one major side wall panel;

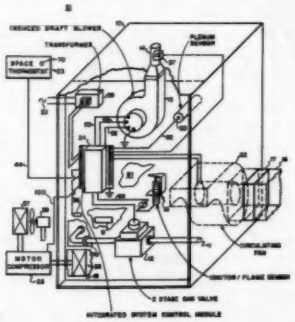
(ii) a pair of friction-lock flaps foldably joined to opposite end edges of said retaining panel and folded 90° to lie in face-to-face relation with adjacent inner surfaces of respective minor side wall panels.

4,421,268

INTEGRATED CONTROL SYSTEM USING A MICROPROCESSOR

William W. Bassett, Wayzata, and Dean R. Rask, Minneapolis, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 17, 1980, Ser. No. 197,842
Int. Cl.³ F23N *3/00*
U.S. Cl. 236—10 **9 Claims**



1. An improvement in a temperature control system for use with a temperature conditioning apparatus having a power blower delivering exhaust gases from a combustion chamber to an exhaust stack, the improvement comprising

temperature responsive means responsive to the output exhaust gas temperature of the temperature conditioned apparatus,

first means connected to said temperature responsive means to respond to a decrease in said exhaust gas temperature from a predetermined temperature,

ambient temperature responsive means adapted to respond to the ambient temperature of the temperature conditioning apparatus, and

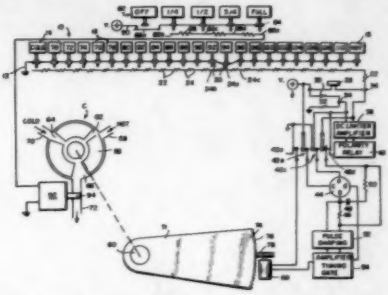
second means connecting said ambient temperature responsive means to said first means whereby said first means responds to a predetermined difference between the temperature of the exhaust gas and ambient temperature.

4,421,269

SYSTEM FOR CONTROL OF WATER TEMPERATURE

Si-Ling Ts'ao, 3rd Floor, No. 1-1, Alley 16, Ln. 553, Section 4, Chung Hsiao East Rd., Taipei, Taiwan

Filed Jan. 22, 1982, Ser. No. 341,710
Int. Cl.³ G05D *23/00*; F16K *31/02*; H01C *10/46*
U.S. Cl. 236—12.12 **14 Claims**



1. A system for control of water temperature from a valve having cold and hot water inlets and a discharge outlet comprising a reversible motor means to shift said valve to one side to decrease the cold water and increase the hot water and to the other side to increase the cold water and decrease the hot water, including a worm gear means to reduce the speed of the motor, a control circuit embodying a plurality of first selectively operable pushbutton means representing a range of water temperature from cold to hot and further including a plurality of resistances corresponding in number to said pushbuttons, each pushbutton being operated to produce a resistance value representing said, hence, the desired water temperature, sensor means for detecting the actual temperature of the water from said outlet and also to produce a resistance value, said resistance values of desired water temperature and actual water temperature being combined to produce a signal, signal means, comparison means including a vibrator switch comparing said signals produced by said signal means at regular intervals for detecting their differential, said comparison means also including a polarity relay for detecting the polarity of said differential, hence, the direction of rotation of said reversible motor means, a DC limiter and pulse-shaping means to control the angle of rotation of said valve in a direction to decrease said differential in temperature to a minimum and stabilize at said selected water temperature and indicator means including a lamp lighting up when said differential in temperature becomes a minimum.

4,421,270

ELECTRONIC TEMPERATURE CONTROL

William F. Raleigh, Valencia, and Patrick J. Keegan, Sepulveda, both of Calif., assignors to Teledyne Industries, Inc., Los Angeles, Calif.

Division of Ser. No. 184,638, Sep. 8, 1980, Pat. No. 4,361,274. This application Nov. 18, 1981, Ser. No. 322,454
Int. Cl.³ F23N *1/08*; G05D *23/00*
U.S. Cl. 236—20 R **3 Claims**

1. An electronic temperature control for use with swimming pool and spa water heaters comprising:

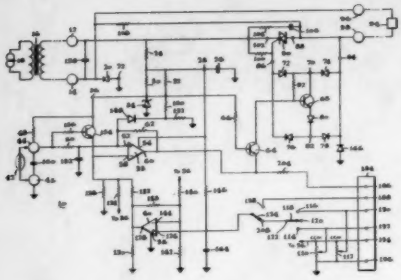
means for sensing the temperature of the water to be heated including a thermistor;

means for generating a first electrical signal proportional to the sensed temperature including means for deriving a voltage across the thermistor from a power supply;

means for generating a second electrical signal proportional to a desired water temperature;

means for comparing the sensed temperature with the de-

sired temperature setting by electronically comparing the first electrical signal with the second electrical signal; and means for limiting the voltage appearing across the thermistor to less than the voltage appearing at the power supply in the event of a single component failure in the electronic



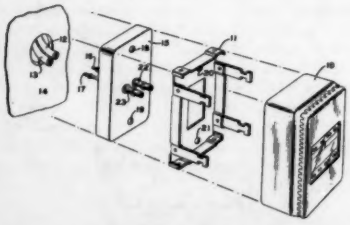
temperature control, including a first current limiting element connected in series with the thermistor to form a series circuit, a second plurality of current limiting elements connected in series between the series circuit and the power supply, and a third plurality of current limiting elements connected in parallel with the series circuit.

4,421,271

ZERO ENERGY BAND SUBBASE FOR PNEUMATIC THERMOSTATS

Gideon Shavit, Highland Park, Ill., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Mar. 15, 1979, Ser. No. 20,692
Int. Cl.³ G05D *23/02*
U.S. Cl. 236—82 **6 Claims**



1. A pneumatic subbase for modifying the operation of a pneumatic thermostat, said subbase comprising:

first connecting means having a first nozzle adapted to be connected to a source of main pressure and a second nozzle adapted to supply a branch output pressure to a controlled apparatus;

second connecting means comprising a third nozzle adapted to connect the main pressure from said first nozzle to a pneumatic thermostat and a fourth nozzle adapted to receive output pressure from said thermostat; and,

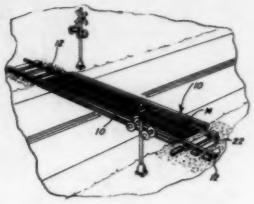
dwell relay means for connecting directly said first nozzle to said third nozzle and connected to said second and fourth nozzles for providing a dwell period in the branch output pressure of said second nozzle as a function of the output pressure received by said fourth nozzle from said pneumatic thermostat, said dwell relay means comprising first, second and third diaphragm module units and a restriction.

4,421,272

SPLICING AND GRADE CROSSING CONSTRUCTION

Jacob O. Whitlock, Springfield, Ill., assignor to Structural Rubber Products Company, Springfield, Ill.

Continuation of Ser. No. 84,371, Oct. 12, 1979, abandoned. This application Mar. 4, 1982, Ser. No. 354,883
Int. Cl.³ E01C *9/04*
U.S. Cl. 238—8 **15 Claims**



1. A railway crossing surfacing module comprising a web of elastomeric material positionable against a rail and extending normally toward each one of a pair of rails,

a plurality of gutter portions in the web, some of the gutter portions extending parallel to the rails and some of the gutter portions extending parallel to the edges of the web normal to the rails;

at least one of the gutter portions including a pocket formed adjacent a web edge normal to the rail and having side walls recessed into the elastomeric material on opposite sides of the gutter;

a first aperture formed in the web at the end of the gutter portion containing the pocket spaced apart from the web edge and extending from the bottom of the pocket into the elastomeric material,

the portion of the web forming the aperture being movable toward the web edge by compression of the elastomeric material between the web edge and the aperture, and movable away from the web edge by expansion of the elastomeric material between the web edge and the aperture following compression of the elastomeric material,

a tread surface portion of the web adapted to engage the wheels of vehicles passing over the crossing and an opposite subgrade surface portion facing the ties beneath the rails, and

a second aperture formed in the edge of the web adjacent the gutter end containing the pocket and extending from the tread surface portion through the subgrade surface portion,

said second aperture being spaced apart from the first aperture and adapted to receive a fastening rod extending through the edge of the web into the ties.

11. The method of joining an adjacent pair of railroad crossing surfacing modules which incorporate an upper tread surface portion of elastomeric material and a pair of pockets adjacent the edges of the modules which meet each other with an anchor bar extending from one pocket to the other and including engagement means extending outwardly from the body portion of the bar which comprises:

forcing the modules together by compressing one module against the other before installing the anchor bar,

positioning a first edge of the anchor bar in an edge of each of the pockets,

rotating the anchor bar in a direction about said first edge to

dispose a second edge of the bar opposite the first edge in another edge of each of the pockets,

disposing the engagement means in the elastomeric material during rotation of the bar, and

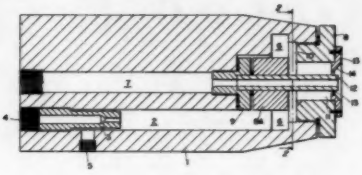
releasing the compression after the anchor bar is installed, whereby the resilient expansion of the elastomeric material to the modules urges the modules into continuous engagement on the engagement means of the anchor bar.

4,421,273

METHOD AND APPARATUS FOR SUPPLYING OXYGEN GAS FOR FUEL COMBUSTION

Per Löfström, Vällingby, Sweden, assignor to AGA Aktiebolag, Lidingo, Sweden

Filed Mar. 17, 1978, Ser. No. 887,612
Claims priority, application Sweden, Mar. 18, 1977, 7703089
Int. Cl.³ B05B 7/10
U.S. Cl. 239—8 **2 Claims**



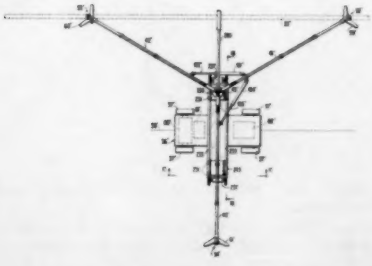
1. A method of supplying oxygen gas for combustion of a sprayed fuel comprising the steps of atomizing fuel within the body of a spray device having a spray aperture, passing the atomized fuel out of the spray aperture of the spray device as a substantially conical spray with the apex of the cone located in the aperture of the spray device, supplying a gas consisting essentially of oxygen from said spray device centrally of the cone while the atomized fuel is being passed out of the spray aperture whereby combustion of the atomized fuel with said oxygen gas takes place in the central part of said cone, and supplying combustion air to the outer surface of the cone such that the temperature generated at said outer surface is lower than that generated in the central part of the cone.

4,421,274

LAND IRRIGATION SYSTEM AND METHOD

Allen T. Noble, Boise, Id., assignor to Noble Linear Irrigation, Inc., Boise, Id.

Continuation of Ser. No. 170,872, Jul. 18, 1980, abandoned, which is a continuation of Ser. No. 887,792, Mar. 17, 1978, abandoned. This application Apr. 6, 1982, Ser. No. 366,097
The portion of the term of this patent subsequent to Oct. 20, 1998, has been disclaimed.
Int. Cl.³ B05B 3/18
U.S. Cl. 239—183 **7 Claims**



1. For use in connection with a land irrigating system in which a moving water sprinkler means having water inlet means extends laterally to and moves along the length dimension of a stationary water supply means having a plurality of water outlet valve means at spaced points along the length thereof, an apparatus for successively connecting water outlet valve means of the stationary water supply means with the water inlet means of the sprinkler means comprising

conveyance means for moving along the length dimension of the stationary water supply means at the same overall rate of movement as the moving sprinkler means,

water receiving conduit junction means carried by the conveyance means having water outlet means and water inlet means,

a plurality of elongated water conduit means each having end portions, the elongated water conduit means each being rigid between its end portions, one end portion of each elongated water conduit means being connected for water flow to the water inlet means of the water receiving conduit junction means,

the lenght of each of the elongated water conduit means being substantially less than the distance between adjacent water outlet valve means,

connecting means associated with the other end portion of each elongated water conduit means for successive water flow connection and disconnection with water outlet valve means on the stationary water supply means,

water flow control means for closing each elongated water conduit means to control water flow through the respective elongated water conduit means,

means carried by the conveyance means supporting the water receiving conduit junction means and the associated elongated water conduit means for movement of the water receiving conduit junction means and the connecting means of the associated elongated water conduit means relative to the conveyance means and in a horizontal plane toward and away from successive water outlet valve means,

articulated connecting water conduit means having a water inlet end portion pivotally connected to the water outlet means of the water receiving conduit junction means and a water outlet end portion pivotally connected to the water inlet means of the sprinkler means for water flow from the water receiving conduit junction means to the water inlet means of the sprinkler means,

the articulated connecting water conduit means being pivotally jointed intermediate its end portions whereby the distance between the water receiving conduit junction means and the water inlet means of the sprinkler means can vary to accommodate movement of the conveyance means relative to a water outlet valve means to which an elongated water conduit is connected.

4,421,275

APPARATUS FOR APPLYING REFRACTORY MATERIAL TO REFRACTORY LINED VESSELS

Richard A. Gratton, 34 Thorn St., Sewickley, Pa. 15143

Filed Aug. 17, 1981, Ser. No. 293,604
Int. Cl.³ B05B 3/12
U.S. Cl. 239—226 **2 Claims**

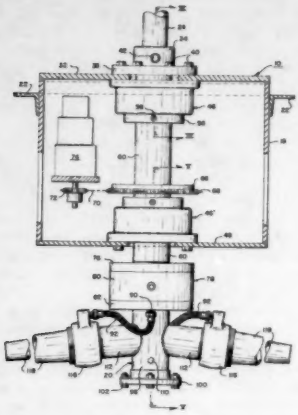
1. In an apparatus for applying refractory material to the interior surfaces of a vessel adapted to contain molten metal, said apparatus including a pair of concentric conduits for separately conveying granular refractory material and water to at least one rotatable discharge nozzle for mixing therein and application to said surfaces thereby, the improvement comprising:

a stationary inner conduit for conveying said granular refractory material;

an outer conduit concentrically disposed about said inner conduit, thereby forming an annular passageway therebetween for conveying said water, and being rotatable about said inner conduit;

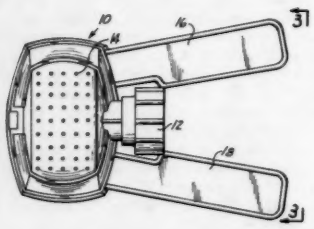
sealing means disposed between said conduits at a location

along the discharge end portion of said stationary inner conduit; and



said discharge nozzle being rotatable with said outer conduit and being in communication with said inner and outer conduits.

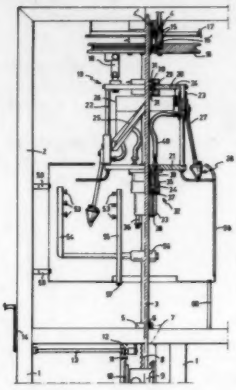
4,421,276
CONVERTIBLE SPRINKLER
J. Linn Rodgers, 9606 La Serna Dr., Whittier, Calif. 90605
Filed Nov. 20, 1981, Ser. No. 323,320
Int. Cl.³ B05B *15/06*
U.S. Cl. 239—273 **5 Claims**



1. A convertible sprinkler head comprising: a sprinkler head; a pair of paddles having adjacent ends, each said adjacent end connected to said sprinkler head by a longitudinally extending hinge, the longitudinal axis of said hinges being generally parallel to each other such that said paddles can be folded together to form a handle or may be unfolded flat to form a stable base for said sprinkler head.

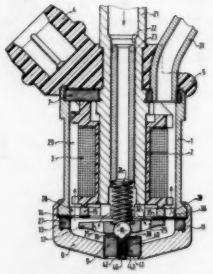
4,421,277
SPRAY HEAD, SUITED FOR INTERNALLY CLEANING SLAUGHTERED POULTRY
Rudolf J. Tieleman, Broekhuizerweg 6, 6983 BM Doesburg, Netherlands
Filed Jul. 13, 1982, Ser. No. 397,744
Int. Cl.³ B05B *1/32*
U.S. Cl. 239—456 **9 Claims**

1. Apparatus for internally cleaning slaughtered poultry, comprising, a spray head and means for moving the spray head forwardly into the body of a slaughtered bird which is supported on the apparatus to clean the bird internally, said spray head being formed of two portions connected to each other by screw threads, at least one said portion being provided with an axial bore for delivering cleaning liquid, said spray head having a peripheral outlet slot which is defined by and located between said portions, said peripheral outlet slot being connected to the axial bore and being located substantially in a plane which is perpendicular to the axis of at least one of the



portions, characterized in that the spray head (**28**) comprises a truncated conical portion (**41**) and a conical portion (**42**), said conical portion and said truncated conical portion having exterior surfaces which converge toward the forward end of the nozzle, said axial delivery bore (**44**) being formed in the truncated-conical portion and discharging directly into the peripheral outlet slot (**46**).

4,421,278
INJECTION VALVE
Wolfgang Kienzle, Schwieberdingen, and Rudolf Krauss, Stuttgart, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany
Continuation of Ser. No. 276,126, Jun. 22, 1981, abandoned.
This application Apr. 1, 1983, Ser. No. 481,178
Claims priority, application Fed. Rep. of Germany, Jun. 25, 1980, 3023757
Int. Cl.³ B05B *1/08*; F02M *51/08*
U.S. Cl. 239—533.12 **7 Claims**



1. An injection valve for fuel injection systems of internal combustion engines,

said injection valve including a movable valve element engageable with a fixed valve seat disposed in a valve seat body,

said valve seat body having an axial bore extending downstream of said fixed valve seat,

said bore providing an annular wall adapted to receive a charge controlling device comprising an insert having a fluted section consisting of lands and grooves,

said insert lands engaging the bore wall to secure the charge controlling device in said bore and said grooves providing a plurality of axially extending fuel flow dividing pathways through said bore,

and diversion means downstream of said charge controlling device serving to divert fluid flow from said bore into a fan-type spray for injection into an intake tube of said engine.

4,421,279

ARTICULATED COUPLING PARTICULARLY FOR ADJUSTING THE JET INCLINATION OF IRRIGATORS IN GENERAL

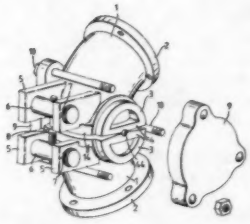
Arno Drechsel, Via Weggenstein, 29, 39100 Bolzano, Italy

Filed Apr. 21, 1981, Ser. No. 256,237

Claims priority, application Italy, May 23, 1981, 46840 A/80

Int. Cl.³ B05B *15/08*

U.S. Cl. 239—546 **10 Claims**



1. An articulated coupling for adjusting the jet inclination of irrigators comprising two tubular members in constant direct communication with each other for feeding liquid to an irrigator discharge nozzle, and tubular members comprising, a first tubular member having an end, and a second tubular member having an end, said end of said first tubular member being profiled and comprising a cusp-shaped end face having an apex axis at a diameter of said end, surfaces of said cusp-shaped end face on opposite sides of said apex being chamfered to converge toward said apex axis and being in opposed facing relation to an end face of said second tubular member, coupling means connecting said tubular members together for pivotal movement with respect to each other about a fixed axis corresponding essentially to said apex axis, from a first position in which surfaces of the end faces of the tubular members on one side of the apex axis engage each other, deformable seal means adjacent said end faces for sealing said ends throughout movement between said first and second positions, and adjustment means externally of and connected between said tubular members for selectively pivoting said tubular members about said fixed axis to any selected position between said first and second positions, while liquid is flowing through said tubular members, said adjustment means including means for maintaining said tubular members at the selected position of adjustment.

4,421,280

FUEL INJECTOR

Donald J. Lewis, Troy, and Jack R. Phipps, St. Clair Shores, both of Mich., assignors to The Bendix Corporation, Southfield, Mich.

Filed Sep. 28, 1981, Ser. No. 306,258

Int. Cl.³ B05B *1/32*

U.S. Cl. 239—585 **12 Claims**

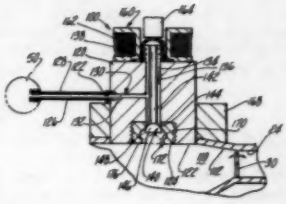
1. A fuel injector responsive to activation signals comprising:

a body adapted to receive pressurized liquid petroleum gas (LPG) fuel;

valve means, operatively connected to said body for defining in cooperation with said body an exit orifice and for selectively permitting said fuel to exit therefrom including first means for developing a pressure drop to allow said fuel to vaporize upon ejection therefrom and for causing such vaporization to occur at or beyond said exit orifice for limiting the flow of heat from said fuel injector due to the cooling effect associated with such vaporization;

a conduit system, within said body, for communicating fuel to said valve means;

plunger means operatively connected to said valve means for selectively opening and closing said valve means;



electromagnet means, connected to said plunger means for moving said plunger means in response to activation signals input thereto; and

bellows means having an effective bellows area, attached to said body and forming an expandable portion of said conduit system for pressure balancing the effective bellows area and the exit area of said exit orifice so that variations in the pressure within said conduit system will not cause said valve means to prematurely open for pressure balancing the pressure forces applied to said valve means and to said plunger means to maintain the electromagnetic force needed to open said valve means at a relatively constant value and for biasing said plunger means in a direction to close said valve means during non-fuel injecting periods.

4,421,281

CONTAINERS AND HOLDERS THEREFOR FOR USE IN ELECTROSTATIC SPRAYING

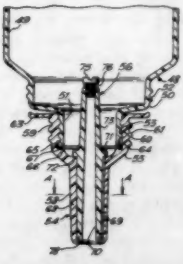
Ronald A. Coffee, Haslemere, and Peter C. Bennett, Churt, both of England, assignors to Imperial Chemical Industries PLC, London, England

Filed Nov. 3, 1981, Ser. No. 317,852

Claims priority, application United Kingdom, Nov. 11, 1980, 8036174

Int. Cl.³ B05B *5/02*

U.S. Cl. 239—690 **6 Claims**



1. A container for mounting on a holder for the electrostatic

spraying of liquids said container including a vessel having a neck and an electrically-conductive nozzle in said neck having a body, a mouth for dispensing liquid from the vessel and a permanent predetermined air-bleed for feeding air into the vessel:

said body comprising vertically aligned co-axial outer and inner tubes, the outer tube being shorter and having a height at least twice its diameter and said inner tube having an upper end extending at least into the neck of the vessel;

said mouth being formed by the radial gap between adjacent lower ends of the tubes;

ribs being provided on the surface of one tube to space it from the second tube and to form channels communicating with the vessel to deliver liquid therefrom to the mouth; and

said air-bleed comprising a bung supported within the bore of the upper end of said inner tube, the bung and the bore co-operating to provide a predetermined non-adjustable extended pathway through which air can enter the vessel.

4,421,282

APPARATUS FOR FORMING AND PACKAGING MULTISTRAND ROVING

Charles D. McKinney, III, Anderson, S.C., assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation of Ser. No. 287,011, Jul. 27, 1981, abandoned. This application Mar. 28, 1983, Ser. No. 477,596

Int. Cl.³ B65H *54/02, 54/20*

U.S. Cl. 242—18 G **8 Claims**

1. Apparatus for packaging a roving comprised of a plurality of strands of fibers comprising, a primary strand guide having means separating the strands and maintaining the strands in spaced relation, a secondary strand guide engaging the strands below the primary guide, a winding apparatus including a rotating collector upon which the roving is wound into a package, an elongated support member arranged in substantial parallelism with the axis of movement of the strands toward the rotating collector, relatively movable means mounted by the elongated support member connected with the secondary guide, said relatively movable means arranged to move the secondary guide from an uppermost position to a lowermost position, a substantially horizontal reciprocable member connected with the elongated member and supporting the elongated member, motive means mounted by the horizontally reciprocable member for moving the secondary guide lengthwise of the elongated support member, a rotatable and reciprocable traverse means disposed adjacent the collector for converging the strands into a roving and distributing the roving lengthwise of the package, and means for laterally reciprocating the elongated support member and secondary guide in synchronism with the reciprocations of the traverse means.

4,421,283

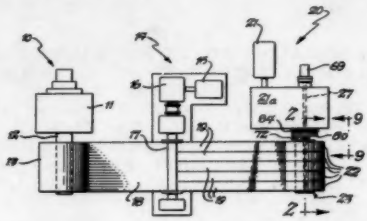
STRIP RECOILING APPARATUS

John W. Rippin, Streetsville, Canada, assignor to Pro-Eco Limited, Mississauga, Canada

Filed Jun. 23, 1981, Ser. No. 276,675

Int. Cl.³ B65H *19/04, 75/24*

U.S. Cl. 242—56.9 **8 Claims**



1. In a strip recoiling drum including sidewalls movable between radially inner and outer positions whereby the circumference of the drum may be varied and further including a longitudinal gripping slot having a movable gripper capable of engaging an end of a strip placed in the slot; the improvement comprising

engaging means including first extensible and retractable means capable, while said drum is rotating, of causing said sidewalls to move towards said radial outer position to expand said drum, and also being capable of simultaneously causing said gripper to engage the end of a strip of material; and

releasing means including second extensible and retractable means spaced away from said first extensible and retractable means and capable, while said drum is rotating; of causing said sidewalls to move towards said radial inner position to contract said drum, and also being capable of simultaneously causing said gripper to release the end of a strip of material.

4,421,284

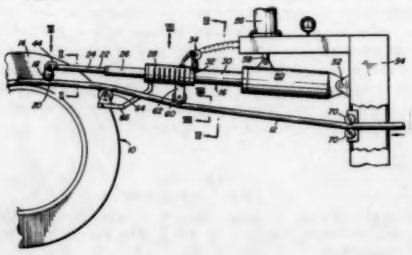
REELING OF CABLE

Ali Pan, Storrington, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Aug. 19, 1981, Ser. No. 294,405

Int. Cl.³ B65H *54/28*

U.S. Cl. 242—158 R **25 Claims**



1. A cable laying apparatus comprising a mounting for a reel in a reel mounting position; means to rotate the mounted reel about its axis; a cable guide mechanism incorporating guide roller means carried upon a support on one side of a pass line

for cable as it is wound onto the reel, and a traversing means to relatively traverse the guide roller means and the reel mounting in one direction to provide one layer of windings and then in the opposite direction to provide a succeeding layer of windings; force applying means to apply a force through the guide roller means and through the feedpath at an angle to both the direction of relative traverse and to a plane normal to the reel axis, said force having a first component opposite to the direction of relative traverse of the guide roller means and a second component inwardly towards said reel axis so as to urge cable as it is wound onto the reel both inwardly of the reel against windings of a previous layer and axially against the previous winding of the layer being formed; and means operable at the end of each traverse to change the direction of traverse and the direction of said force relative to said plane by changing the first component of the force to correspond to the change in the direction of traverse.

4,421,285

FISHING REEL

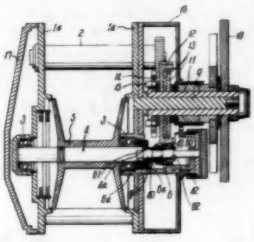
Hideo Noda, Sakai, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Filed Oct. 27, 1981, Ser. No. 315,459

Claims priority, application Japan, Nov. 15, 1980, 55-163674[U]

Int. Cl.³ A01K *89/00*

U.S. Cl. 242—221 **3 Claims**



1. A fishing reel comprising:

a reel body having a pair of side walls opposite to each other;

a spool shaft having a spool shaft journalled to said side walls at said reel body, said spool shaft having a projecting shaft portion projecting axially outwardly from one of said side walls; and

drive mechanism for driving said spool shaft, said drive mechanism having a handle bar, a master gear driven by operation of said handle bar, a tubular pinion having a through bore in mesh with said master gear and a clutch means releasably coupling said pinion with said spool shaft so that rotation of said pinion induces rotation of said spool shaft when said pinion and spool shaft are coupled; said pinion being supported axially slidably and rotatably to said projecting shaft portion which passes through said through bore, said clutch means uncoupling said pinion and spool shaft when said pinion slides in a first direction and coupling said pinion and spool shaft when sliding in a second direction, said pinion being provided at an axially intermediate portion of its inner periphery with at least one annular recess and at both axial sides of said recess with at least first and second bearing portions in contact with the outer periphery of said projecting shaft portion, said projecting shaft portion having a first, smaller diameter portion larger in axial length than said first bearing portion at the outer periphery of said projecting shaft portion and at a position opposite to said first bearing portion when said pinion axially slides to allow said spool shaft to freely rotate.

4,421,286

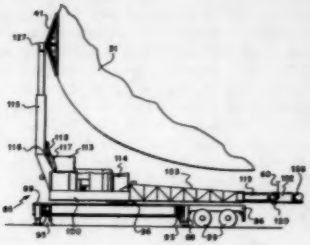
MOORING SYSTEM

Tibor Laky; William C. Lane, both of Dallas, and Kebbie J. Turner, Sr., Frisco, all of Tex., assignors to Otis Engineering Corporation, Dallas, Tex.

Continuation of Ser. No. 63,059, Aug. 2, 1979, abandoned, which is a continuation of Ser. No. 235,457, Feb. 18, 1981, abandoned. This application Jul. 6, 1982, Ser. No. 395,116

Int. Cl.³ B64F *1/14*

U.S. Cl. 244—116 **17 Claims**



1. A mooring system for an aerostat, comprising:

a. a platform means supported on a bearing;

b. a mast structure extending from the platform means;

c. a main winch system mounted on the platform means for releasing and retrieving the aerostat;

d. means for rotating the platform on the bearing;

e. the mast structure further comprising a vertical section with a nose receptacle mounted thereon, the nose receptacle being adapted to engage the aerostat, outriggers extending horizontally from the platform and spaced radially from each other, and means for securing the aerostat to the outriggers;

f. fairlead sheave means for a tether line from the main winch system to the aerostat; and

g. movable support means for the fairlead sheave means for adjusting the distance between the mast structure and the fairlead sheave means to accommodate various aerostat sizes.

4,421,287

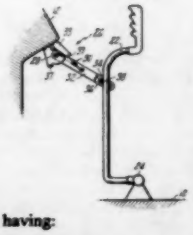
HELICOPTER CYCLIC STICK MIDPOSITION FEEL INDICATOR

Ronald A. Durno, Trumbull, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Nov. 16, 1981, Ser. No. 322,105

Int. Cl.³ B64C *13/08, 29/02*

U.S. Cl. 244—223 **2 Claims**



1. A helicopter having:

a fuselage;

a multi-bladed rotor mounted for rotation from said fuselage about an axis of rotation and comprising:

a plurality of variable pitch helicopter blades mounted to rotate as part of said rotor to establish the rotor plane

and responsive to cyclic pitch change to selectively tilt the rotor plane to various positions including a horizontal position in which the rotor plane is substantially parallel to the ground when the helicopter is on the ground, and a forward tilt plane position in which the blades sweep close to the ground;

a cyclic control stick operatively connected to vary blade pitch cyclically and mounted for universal motion about a fixed point in said fuselage and having a midposition which causes the rotor plane to be in said horizontal position;

a cyclic stick "feel" position indicator comprising an over-center toggle means pivotally supported in the fuselage so as to be manually pivotable between a first position in which the "feel" position indicator is clear of the cyclic stick sufficiently so that the cyclic stick can be moved without interference throughout its entire motion pattern, and a second position in which the "feel" indicator abuts the cyclic stick when the cyclic stick is in its midposition, such that the cyclic stick is continuously free for only intentional pilot imposed universal motion about said fixed point, said "feel" position indicator having a biasing spring operatively connected to bias the toggle means in each of its first and second positions and being of selected spring rate so that if the pilot inadvertently attempts to move the cyclic stick forward of its midposition when the feel indicator is abutting the cyclic stick, he "feels" the resisting force of the biasing spring, but the spring rate of the biasing spring permits the pilot to overpower that resisting force and move the cyclic stick forward and, hence, cause the rotor to move from its horizontal position to its forward tilt plane position by manually applying sufficient force to the cyclic stick, and further so that pilot imposed motion of the cyclic stick forward of its midposition by a predetermined amount with said "feel" position indicator in its second position, will automatically cause said indicator to move to its first position due to the force applied thereto by the biasing spring member.

4,421,288

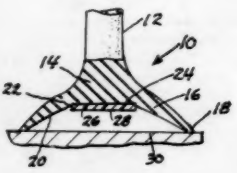
SUCTION CUP

Henry Blaszkowski, P.O. Box 114, Southfield, Mich. 48034

Filed Jan. 19, 1981, Ser. No. 226,074

Int. Cl.³ F16B *47/00*

U.S. Cl. 248—206 R **10 Claims**



1. A suction cup formed of a resiliently flexible material and having an upwardly concave side, said concave side having a generally flat central portion surrounded by a depending outwardly flaring annular skirt which forms the major portion of the concave side of the cup, said central portion having a pressure sensitive adhesive surface with an overlying strippable cover sheet thereon, the outer flat face of said cover sheet lying in a plane closely adjacent the surrounding portion of the concave side of the cup so that when the cup, said adhesive surface being substantially flush with the inner face of the suction cup is pressed firmly against a flat face the annular skirt is adapted to be flattened into coplanar relation with the cover sheet (or said adhesive surface if the cover sheet is removed) whereby a minimum of air is trapped between the suction cup and said flat surface and as a result thereof the degree of suction obtainable with the cup is not diminished by the presence of said adhesive surface with or without the cover sheet.

4,421,289

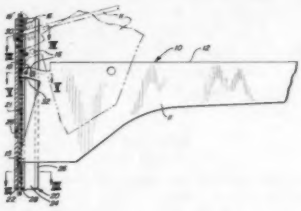
SHELF SUPPORT

William I. Sturm, Niles, Ill., assignor to SP Industries, Inc., Chicago, Ill.

Filed Feb. 22, 1982, Ser. No. 350,868

Int. Cl.³ A47G *29/02*

U.S. Cl. 248—246 **7 Claims**



1. A shelf support comprising: a bracket for extending generally horizontally and forwardly from a wall to support a shelf or the like and including first and second support portions at a rearward end thereof, an elongated support adapted to be secured to a wall and defining first and second support portions for engagement with said first and second support portions of said bracket when said bracket is in a shelf support position, a downward force on the forward portion of said bracket being then effective to develop a torque in one direction pressing said first support portion of said bracket against said first support portion of said support while pressing said second support portion of said bracket against said second support portion of said support, and lock means operative in response to movement of said bracket to said shelf support position to lock said bracket in said shelf support position, said lock means being operative to develop a torque acting in said one direction on said bracket independently of and in addition to any torque developed from the weight of said bracket and any force applied by a shelf thereagainst to firmly press said first and second support portions of said bracket into engagement with said first and second support portions of said support, said lock means being releasable upon upward pivotal movement of said bracket away from a shelf support position into a release position in which the forward end thereof is positioned upwardly with respect to said rearward end thereof, said lock means being in the form of an over-center spring device operable when said bracket is above a position intermediate said shelf support and release positions to urge said bracket upwardly and operable when said bracket is below said intermediate position to urge said bracket downwardly toward said shelf-support position.

4,421,290

SUPPORT LEG FOR MOBILE CONVEYORS

Xaver Frank, Reuthe 86 ½, Lengenwang 8951, Fed. Rep. of Germany

Filed Apr. 20, 1981, Ser. No. 255,464

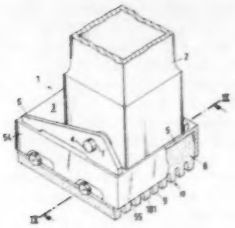
Claims priority, application Fed. Rep. of Germany, Apr. 25, 1980, 3016035; Dec. 4, 1980, 8032342[U]

Int. Cl.³ F16M *13/00*

U.S. Cl. 248—558 **18 Claims**

1. A leg support for a device subject to vibration and movement, said leg support including a substantially flat lower support shoe, a sole member comprising a single block or elastomeric material and including first and second parallel faces, said first and second faces of said block of elastomeric material being adapted to contact said lower support shoe, and said first and second faces of said block of elastomeric material

including substantially uniform treads comprising a plurality of parallel grooves thereacross said grooves including a base portion, whereby upon supporting said device on a surface with said sole member being reversible with either said first or said second face thereof being in contact with said lower support shoe and with said surface, respectively, said sole member may adapt to variations in said surface and to vibrations and movement of said device, support means for detachably maintaining said sole member in a predetermined position in contact



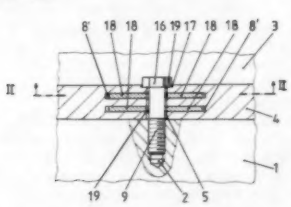
with said lower support shoe, said support means comprising at least one pair of parallel side wall members depending from said lower support shoe so as to encompass said sole member between said side wall members, and support flange means projecting from said lower support shoe and having a pattern corresponding to said grooves in said sole member, whereby said support flange means contacts said base portion of said grooves when said sole member is in contact with said lower support shoe.

4,421,291

DEVICE TO COMPENSATE FOR CRITICAL SPEEDS OF MACHINES

Martin Schluchter, Birr, and Paul Schröder, Wettingen, both of Switzerland, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Jul. 1, 1980, Ser. No. 165,061
Claims priority, application Switzerland, Jul. 3, 1979, 6190/79
Int. Cl.³ F16M *13/00*
U.S. Cl. 248—635 **4 Claims**



1. A vertical electrical machine for compensating for critical speed characteristics thereof comprising:

a base;

a casing;

a flange member having at least one borehole formed therein interconnecting the casing with said base, said flange member having at least one laterally accessible recess formed therein on a side portion of said flange member;

at least one plate-shaped elastic element having a borehole formed therein mounted in said at least one recess, the thickness of said elastic element substantially corresponding to the height of the at least one recess; and

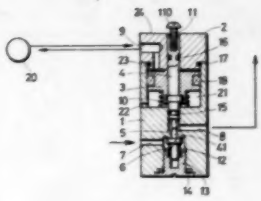
fastening means extending through said borehole formed in said flange member and the elastic element for pressing said flange member onto said base.

4,421,292

AIR-OPERATED OIL PRESSURE CONTROL VALVE

Takahiro Matsui, Uji, and Jun Tamura, Yahata, both of Japan, assignors to Kabushiki Kaisha Morita Seisakusho, Kyoto, Japan

Filed Mar. 31, 1981, Ser. No. 249,387
Claims priority, application Japan, Jun. 18, 1980, 55-85337[U]
Int. Cl.³ F16K *31/124*
U.S. Cl. 251—60 **2 Claims**



1. An air operated oil pressure control valve for a dental treatment bed comprising:

a valve body;

a cover fixed to said valve body;

a piston slidably provided between the valve body and the valve cover;

a first valve rod fixed to said piston;

a valve stopper operated by said first valve rod which freely opens and closes a valve port provided inside of the valve body;

an oil inlet port and an oil outlet port which respectively are opened by said valve port and are provided in said valve body;

an air inlet port provided in said cover to allow compressed air to act on said piston;

a spring for biasing said piston in a direction reversed to the action of said compressed air;

a regulator means for controlling the vertical stroke of said first valve rod;

a second valve rod provided in said valve body to butt against said first valve rod;

a second valve stopper provided on said second valve rod; and

a second spring provided on said second valve rod for biasing said second valve stopper in a direction to close said valve port;

whereby said valve port closes said oil inlet port and said oil outlet port when compressed air is not applied to said pressure control valve and said oil inlet port and oil outlet port are opened by the opening of said valve port when compressed air is applied so that oil may pass between said oil inlet port and said oil outlet port.

4,421,293

END CAP ASSEMBLY

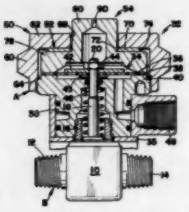
Ulrich H. Koch, Chagrin Falls, and Gerald A. Babuder, Mentor, both of Ohio, assignors to Whitey Co., Highland Heights, Ohio

Filed Sep. 28, 1981, Ser. No. 305,966
Int. Cl.³ F16K *31/126*; F16J *3/02*
U.S. Cl. 251—61.4 **12 Claims**

1. In a valve actuator of the type including an actuator body having one end thereof adapted for connection to and communication with a valve body such that an elongated valve operating stem protruding outwardly from the valve body extends from the actuator body one end toward an opposite open end; a flexible diaphragm disposed across the actuator body and adapted for operative connection to a valve operating stem adjacent the outermost end thereof, the diaphragm including a band-like margin adjacent the outer periphery thereof having

one face supported adjacent the actuator body open end; means for introducing a fluid flow to at least one side of the flexible diaphragm for selectively causing diaphragm flexure whereby an associated valve actuating stem is linearly shifted for causing a valve member to be shifted between valve opened and closed conditions; and, an end cap threadedly secured to the actuator body for covering the open end thereof, the improvement comprising:

an end cap assembly including a cup-shaped nut including a side wall having an internally threaded area adapted for threaded receipt by said actuator body open end and a bottom wall having a centrally located aperture extending therethrough; a cap member received in said nut including



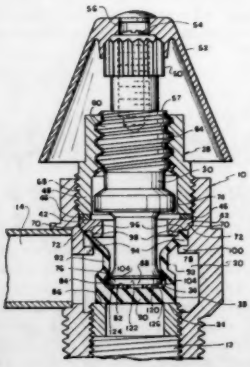
a radial flange portion and a central stub, said flange portion including means adapted for engaging the outer face of the diaphragm margin area with said stub extending outwardly through said nut aperture; biasing means interposed between said nut bottom wall and said cap member flange for continuously urging said engaging means axially toward retaining engagement with the margin area other face, said biasing means comprising a conical disc spring received over said stub intermediate said nut bottom wall and said cap member flange portion; and, said nut and cap member being dimensioned such that they are rotatable relative to each other such that said cap member may be retained generally stationary as said nut is threadedly advanced onto an associated actuator body.

4,421,294

VALVE DIAPHRAGM

Richard G. Parkison, and Edward G. Hofstetter, both of Louisville, Ky., assignors to American Standard, Inc., New York, N.Y.

Filed Aug. 13, 1981, Ser. No. 292,527
Int. Cl.³ F16K *7/16, 25/00*
U.S. Cl. 251—86 **14 Claims**



1. In a valve structure for controlling fluid flow comprising a valve assembly and a valve housing; said valve housing including a valve chamber incorporating fluid inlet and outlet conduits and a valve seat, and said valve assembly disposed within said housing and comprising a valve stem and stem collar; said valve stem movable engaged within said collar and extending beyond said collar at both ends and having a first intermediate radially expanded flange disposed about the intermediate portion of said valve stem and within said collar and a second radially expanded terminal flange spaced from said first flange and provided about the lower end of said valve stem and below the level of said collar; said intermediate and terminal flanges being connected by a constricted neck; an angular stop ring disposed about said valve stem and in spaced relation thereto below the level of said collar; a swivel bearing cup having a rim abutting said terminal flange of said valve stem; a resilient, compressible, annular valve diaphragm including a radially expanded end closure means, sealing ring and a constricted interconnecting neck, said end closure means being secured about said swivel bearing cup in spaced relation to that portion of said terminal flange encapsulated by said swivel bearing cup, said swivel bearing cup being disposed adjacent to said constricted neck of said valve diaphragm, and said closure means being adapted to seat on said valve seat to impede fluid flow through said valve chamber when said valve assembly is disposed in a closed position; said swivel bearing cup and valve diaphragm end closure means being adapted to move toward and away from said valve seat with corresponding axial movement of said valve stem; said valve stem being adapted to rotate independently of said swivel cup and said diaphragm in affecting said axial movement; said sealing ring being secured to said stop ring and mounted thereon in spaced relation about said valve stem; and said constricted interconnecting neck being adapted to axial expansion and contraction with movement of said stem, said swivel bearing cup and said diaphragm end closure means toward and away from said valve seat; the improvement that comprises a radial space provided between the upper portion of said neck of said valve stem and the inner diameter of said stop ring such that said space comprises up to about 160 percent of the thickness of said diaphragm neck to assist in preventing undue involution or collapse of said constricted neck of said valve diaphragm when said end closure means is withdrawn from said valve seat to prolong the life of said valve diaphragm.

4,421,295

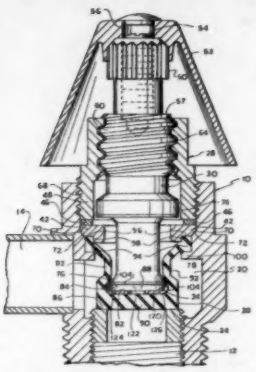
VALVE DIAPHRAGM

Richard G. Parkison, Louisville, Ky., assignor to American Standard, Inc., New York, N.Y.

Filed Aug. 13, 1981, Ser. No. 292,595
Int. Cl.³ F16K *7/16, 25/00*
U.S. Cl. 251—86 **17 Claims**

1. A valve structure for controlling fluid flow comprising a valve assembly and a valve housing; said valve housing including a valve chamber incorporating fluid inlet and outlet conduits and a valve seat, and said valve assembly disposed within said housing; and comprising a valve stem and stem collar; said valve stem movably engaged within said collar and extending beyond said collar at both ends and having a first intermediate radially expanded flange disposed about the intermediate portion of said valve stem and within said collar and a second radially expanded terminal flange spaced from said first flange and provided about the lower end of said valve stem and below the level of said collar, said intermediate and terminal flanges being connected by a constricted stem neck; an annular stop ring disposed about said valve stem and in spaced relation thereto below the level of said collar; a swivel bearing cup having a rim abutting said terminal flange of said valve stem; a resilient, compressible annular valve diaphragm including a radially expanded end closure means, sealing ring and a constricted interconnecting neck, said end closure means being secured about said swivel bearing cup in spaced relation to that portion of said terminal flange encapsulated by said swivel bearing cup, said swivel bearing cup being disposed adjacent to

said constricted neck of said valve diaphragm, and said closure means adapted to seat on said valve seat to impede fluid flow through said valve chamber when said valve assembly is disposed in a closed position; said swivel bearing cup and valve diaphragm end closure means being adapted to move toward and away from said valve seat with corresponding axial movement of said valve stem; said valve stem being adapted to



rotate independently of said swivel cup and said diaphragm in affecting said axial movement; said sealing ring being secured to said stop ring and mounted thereon in spaced relation about said valve stem; and said constricted interconnecting neck being adapted to axial expansion and contraction with movement of said stem, said swivel bearing cup and said diaphragm end closure means toward and away from said valve seat.

4,421,296

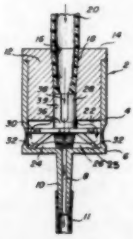
DISPOSABLE PLASTIC RECIPROCATING VALVE

James W. Stephens, Memphis, Tenn., assignor to Medical Valve Corporation, Memphis, Tenn.

Continuation-in-part of Ser. No. 169,642, Jul. 17, 1980, abandoned. This application Aug. 11, 1981, Ser. No. 291,948

Int. Cl.³ F16L *37/28*

U.S. Cl. 251—149.7 **4 Claims**



1. A reciprocating valve comprising,

a generally cylindrical hollow casing enclosing a valve chamber defined between axially-spaced inner walls of said casing, one of which walls constitutes a valve seat,

said casing having a bore extending axially therein from one end thereof and through said seat into said chamber,

a reciprocating valve comprising a disc disposed in said chamber, said disc having port means therethrough, stem means on one side thereof reciprocable in said bore, and spring leg means on the other side thereof for engaging the other inner wall of said chamber so as normally to force said disc in seating engagement against said seat,

service port means for said chamber,

said stem means having an open hollow free end portion constituting a service port for receiving a fluid coupling member, a closed end portion integral with said disc, and port means extending from the hollow free end portion to the periphery of the stem,

said port means through the stem and disc being normally masked by the wall of said bore and said seat, respectively, when said spring legs force the valve in one direction to engage the disc against said seat, and being open when said fitting engages into said stem socket and forces the valve member in the other direction against the forces of said spring legs so as to space the disc from the seat and thereby unmask the port means therethrough while moving the port means in the stem beyond the wall of the bore and thereby unmask the same whereby to establish a fluid path from the socket, the port means in the stem, the space between the disc and the seat, the port means in the disc, the valve chamber, and the service port means for the chamber.

4,421,297

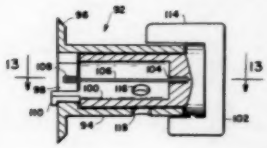
SELF-CLOSING FLUID DISPENSING VALVES

Robert G. Pongrass, #2A Bulkara Rd., Bellevue Hill, New South Wales, Australia, and Christopher C. Rutter, 24174 Dover La., Hayward, Calif. 94541

Filed Nov. 2, 1981, Ser. No. 317,060

Int. Cl.³ F16K *5/00*

U.S. Cl. 251—310 **3 Claims**



1. A self-closing fluid dispensing valve comprising:

a tubular housing having first and second open ends, said first end having a flange in a plane perpendicular to the longitudinal axis of said tubular housing for attaching and sealing said housing to the exterior wall of a fluid container, said housing having a fluid dispensing radial opening through the wall adjacent said second end;

a tubular barrel coaxially rotatable within the bore of said tubular housing, said barrel having a first open end within said housing and a second closed end adjacent the second end of said housing, said closed end having attached thereto a manually operable handle for rotation of said barrel, said barrel having a fluid dispensing radial opening positioned for coaxial alignment with the radial opening in said housing; and

resilient means within the bore of said tubular barrel said means having a first end coupled to said tubular housing and a second end coupled to said tubular barrel, said resilient means providing a rotational force for rotating said housing and said barrel to an off position where their respective fluid dispensing radial openings are not aligned.

4,421,298

Y PATTERN VALVE

Edmund Kujawski, Coleridge Pl., Greenlawn, N.Y. 11740

Filed Mar. 4, 1981, Ser. No. 240,601

Int. Cl.³ F16K *31/44*

U.S. Cl. 251—368 **13 Claims**

1. A Y pattern valve for controlling a gas flow, comprising:

a valve body having;

a first inner cylindrical chamber having an inlet port and an outlet port for said gas flow;

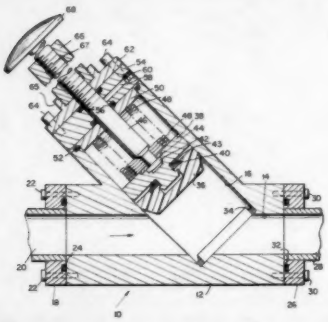
a second inner cylindrical chamber intersecting said first inner cylindrical chamber at an oblique angle, said second inner cylindrical chamber having a diameter substantially greater than the diameter of said first inner cylindrical chamber in order to provide ledge means for supporting;

valve seat means disposed at said intersection and on said ledge means; and

a substantially rectilinear valve stem coaxially disposed within said second inner cylindrical chamber and having affixed thereto inner terminal valve seal means, whereby inwards axial movement of said valve stem causes said valve seal means to engage said valve seat means so that said gas flow is controlled;

said valve seal means comprising a terminal flexible and resilient valve seal member and a valve plug disposed between the terminus of said valve stem and said valve seal member, said valve plug being mounted to the terminus of said valve stem, said valve seal member being mounted to said valve plug;

said valve seat means having a sharp angled outer edge which engages said valve seal member, so that a portion of said valve seal member rolls over the outer edge or lip of said valve seat means and flows along the inclined surface of said valve seat means, to provide a wiping of said valve seat means by said valve seal member, whereby any solid



particulate matter which has accumulated is removed, and so that the collection of any solid particulate matter on said valve seat means is minimized;

together with a bearing washer and a dished washer, said bearing washer being coaxially positioned on the surface of said valve seal member between said valve seal and said valve plug, said dished washer being coaxially positioned between said bearing washer and said valve plug, with the concave side of said dished washer facing said bearing washer;

so that when said valve seal means engages said valve seat means, said valve seal member enters the interior of said valve seat means, and said dished washer is caused to flatten out, so as to prevent said valve stem from jamming said valve seal member into said valve seat means;

and together with a vacuum sealing closure bellows, said bellows extending coaxially and concentrically about said stem and between said valve plug and a backing plate portion of said valve body, said backing plate portion being disposed at the outer end of said second inner cylindrical chamber and extending transversely to said stem, said vacuum sealing closure bellows providing closure sealing against vacuum loss while permitting axial movement of said stem and appurtenances thereto, with one end of said bellows being attached in a gas-tight manner to said valve plug, and the other end of said bellows being attached in a gas-tight manner to said backing plate portion of said valve body.

4,421,299

WINDOW CABLE DRIVING MECHANISM

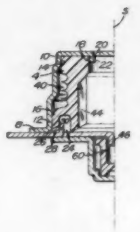
Hans-Peter Hess, Coburg, Fed. Rep. of Germany, assignor to Metallwerk Max Brose GmbH & Co., Coburg, Fed. Rep. of Germany

Filed Feb. 25, 1981, Ser. No. 238,142

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1980, 3008296

Int. Cl.³ B66D *1/04*; E05F *11/48*

U.S. Cl. 254—342 **4 Claims**



1. A window cable driving mechanism particularly for a motor vehicle comprising: a base plate; a cable drum supported at one side of said base plate, said cable drum having an annular configuration with a hollow internal portion provided with a toothed construction; pinion means located in said hollow internal portion engaging in said toothed construction of said cable drum; crank bolt means connected to drive said pinion means; coiled spring brake means located at the side of said base plate opposite said cable drum connecting said crank bolt in driving engagement with said pinion means to drive said cable drum through said pinion means; bracket means attached on said base plate enclosing said cable drum; lug means bent to extend from said bracket means for defining supporting bearing surface means at which said cable drum is rotatably supported, said cable drum further comprising rolling surface means extending parallel to the axial direction of said cable drum for engaging said bearing surface means to rotatably support said cable drum in said driving mechanism; housing means fastened to said base plate on a side thereof opposite said one side, said housing means having said coiled spring brake means located therein; said pinion means extending through said cable drum and being supported at one end thereof on said bracket means and at an opposite end thereof on said base plate, with a centrally located internal bore being provided in said pinion means at said opposite end; said crank bolt means being supported in said housing and extending interiorly thereof into supported engagement in said internal bore of said pinion means.

4,421,300

VEHICLE RAMP

Phillip L. Lundman, 419 Wheeler Ave., Fredonia, Wis. 53021

Filed Mar. 22, 1982, Ser. No. 360,629

Int. Cl.³ E02C *3/00*

U.S. Cl. 254—88 **1 Claim**

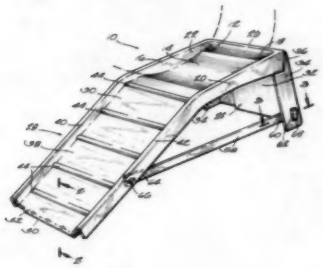
1. A vehicle ramp adapted to rest on a supporting surface and for supporting a vehicle wheel, the vehicle ramp comprising

a platform having a generally horizontal upper surface adapted to support the wheel of a vehicle, said platform having a forward portion and a rearward portion, and said platform including lateral edges extending between said forward portion and said rearward portion, and means for rigidifying each of said lateral edges, said means for rigidifying comprising a channel including an inner elongated vertical side wall having a lower edge joined to said lateral edge of said platform, an outer side wall spaced outwardly from said inner side wall, and a bite portion joining

the upper edges of said inner elongated vertical side wall and said outer side wall,

a single generally vertical leg having an upper end supporting said platform rearward portion, and said vertical leg including opposite generally vertical side walls, said side walls of said leg each including a slot therein,

an inclined ramp adapted to support a vehicle wheel for movement up to said platform, said inclined ramp including a longitudinal axis and having opposite sides, a lower end adapted to engage the ground, and an upper end joined to said forward portion of said platform, said lower end of said inclined ramp including means for engaging the supporting surface as a vehicle wheel engages said lower end of the inclined ramp and applies a downward force on the said lower end and so as to prevent movement of the vehicle ramp away from the wheel as the wheel moves up the inclined ramp, said means for engaging the supporting surface including a blade having a lower edge adapted to engage said supporting surface when weight is placed on said lower end, said blade lower edge extending transversely to the longitudinal axis of said inclined ramp, and said blade being an integral portion of said lower end of said inclined ramp, said inclined ramp including an inclined surface adapted to support a wheel



for movement to said platform and lateral edges generally parallel to the longitudinal axis of said inclined ramp, means for rigidifying each of said lateral edges, said means for rigidifying comprising channels integrally joined to said channels of said platform so as to form continuous elongated reinforcing means,

said platform, said leg, and said inclined ramp having a one piece unitary construction and being integrally joined together and formed from a single continuous stamped sheet metal plate, and means for joining said leg intermediate the opposite ends of said leg to said inclined ramp intermediate said upper end and said lower end of said inclined ramp, said means for joining including an elongated brace member having opposite ends, one of said ends having generally flat portion offset from the longitudinal axis of the brace member in order to be slidably inserted into said slot in one of said side walls of said leg when said elongated brace member is held in a first position and also being adapted to be locked in said slot against removal when said elongated brace is moved from said first position to a second position wherein the opposite end of said brace member engages a side of said ramp, and means for securing said opposite end of brace member to the said side of said ramp.

4,421,301

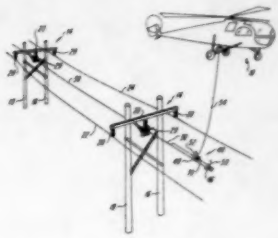
APPARATUS AND METHODS FOR LINE STRINGING

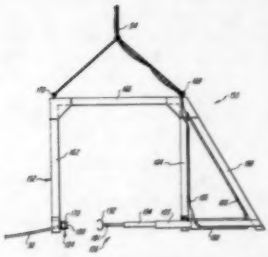
Claude L. Chapman, 3300 W. Union, Englewood, Colo. 80110

Division of Ser. No. 103,348, Dec. 13, 1979, Pat. No. 4,328,952. This application Apr. 1, 1982, Ser. No. 364,529

Int. Cl.³ B66D 1/36

U.S. Cl. 254—134.3 R **2 Claims**





1. A method of aerially stringing a threading line through a series of towers comprising the steps of:

connecting the lower end of a hoist line to a stringing member to suspend the stringing member from the hoist line and an aircraft;

connecting a threading line to the stringing member and maintaining the threading line taut to keep the stringing member in a generally straight-ahead position while suspended by the aircraft; and

advancing the stringing member and attached threading line through a window-like line-holding structure on a tower by manipulation solely from the upper end of the hoist line while being suspended continuously from above by said hoist line while maintaining the threading line taut without changing the length of the threading line, and repeating said advancing for each successive tower without changing stringing members for each successive tower through which said threading line is advanced.

4,421,302

PREFABRICATED ADJUSTABLE HANDRAIL ASSEMBLY

William G. Grimm, 29974 Paint Brush Dr., Evergreen, Colo. 80439, and Ronald W. Pott, 730 Crescent La., Lakewood, Colo. 80215

Filed Jan. 30, 1981, Ser. No. 229,888

Int. Cl.³ F04H 17/14; F16B 9/00; F16C 11/00; F16D 1/12

U.S. Cl. 256—67 **14 Claims**

1. An adjustable, prefabricated handrail assembly comprising:

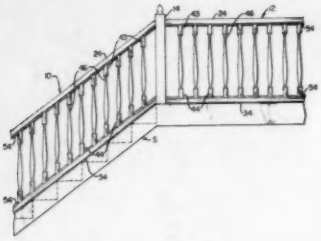
a pair of upstanding end supports;

a rail having a channel portion extending its substantial length;

a plurality of balusters, and means pivotally connecting at

least one end of each of said balusters in spaced relation to one another along the length of said rail in concealed relation within said channel for pivotal movement in a direction lengthwise of said rail; and

fastener means interconnecting each end of said rail to one of said end supports such that said balusters extend vertically in spaced parallel relation to one another irrespective of



the pitch of said rail, each said fastener means defined by a bracket affixed to the inner closed end of said channel portion, said bracket including a connecting end portion having an externally curved surface engageable with the side surface of one of said end supports, and a male connector extending through an open slotted portion in each said connecting end portion interconnecting said bracket to said end support.

4,421,303

COOLING TOWERS

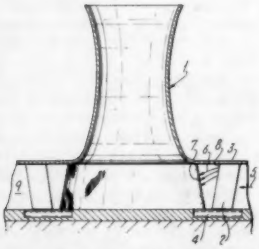
Sydney P. S. Andrew, Hartlepool, England, assignor to Imperial Chemical Industries PLC, London, England

Filed Dec. 1, 1981, Ser. No. 326,413

Claims priority, application United Kingdom, Dec. 10, 1980, 8039610

Int. Cl.³ B01D *47/00*

U.S. Cl. 261—109 **4 Claims**



1. A cross-flow cooling tower having a packing down which the liquid to be cooled flows disposed as an annulus around a central chimney characterised by a perforate sheet member in which the individual perforations have an area within the range of 0.1 to 1 cm^2, and a maximum dimension in the range 0.1 to 2 cm, and the total area of the perforations is at least 50% of the total area of the perforate sheet member, said sheet member extending across the air flow path inside the space enclosed by the inner perimeter of said annulus and adjacent to, but spaced from, said packing such that, as the air flow through said packing increases thereby tending to blow liquid flowing down the packing off the packing as a spray, the degree of obscuration of said perforated sheet member increases as a result of said spray encountering said perforate sheet member partially blocking said perforations thereby blocking the air flow path.

4,421,304

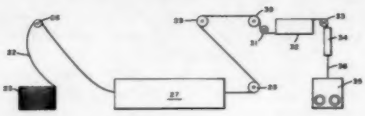
APPARATUS FOR CONTROLLED TEMPERATURE ACCUMULATOR FOR ELONGATED MATERIALS

Jerry M. Hesterlee, Carrollton, Ga., assignor to Southwire Company, Ga.

Filed Dec. 21, 1981, Ser. No. 332,991

Int. Cl.³ C21D *9/56*

U.S. Cl. 266—103 **8 Claims**



1. High speed thermal treatment apparatus for a continously variable length of a continously advancing elongated metallic wire material comprising:

a. a cylinder having an outer surface, a proximal first end, a distal second end, and a longitudinal axis;

b. a predetermined path for the continously advancing elongated metallic wire material which includes a helical path formed by a continuously variable number of wraps circumferentially contacting said cylinder surface beginning adjacent the proximal end thereof and concluding adjacent the distal end thereof,

c. means to rotate the cylinder about its longitudinal axis,

d. heat source means for heating said cylinder to a temperature value within a range of predetermined thermal treatment temperature values,

e. first guide means for adding a variable number of wraps around the cylinder by directing the continously advancing elongated metallic material tangentially into contact with the cylinder surface at the proximal end thereof, and

f. second guide means for removing a variable number of wraps from around the cylinder by directing the continuously advancing elongated metallic material (tangently) tangentially away from the cylinder surface at the distal end thereof.

wherein the length of wire wrapped around the accumulating cylinder is continously variable by rotation of said first and second guide means about the cylinder axis.

4,421,305

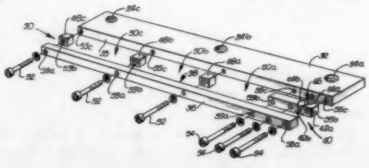
WORKPIECE HOLDING AND ALIGNMENT DEVICE

Wojciech B. Kosmowski, San Juan Capistrano, Calif., assignor to Cooper Industries, Inc., Houston, Tex.

Continuation of Ser. No. 236,847, Feb. 23, 1981, abandoned. This application May 17, 1983, Ser. No. 494,687

Int. Cl.³ B23Q *3/00*

U.S. Cl. 269—287 **3 Claims**



1. A device for holding a workpiece which has alignment pins in an aligned position on a worktable, said device comprising:

a first elongated rectangular bar having at least one substantially straight lengthwise edge, wherein the bar is fastenable to the worktable;

a second elongated rectangular bar having at least one substantially straight lengthwise edge facing the lengthwise edge of the first bar;

first and second spacer segments of a predetermined width positioned between the first and second bars, each of said spacer segments having a trough-shaped end portion facing the trough-shaped end portion of the other segment to define an alignment hole having the appropriate diameter to snugly accomodate a workpiece alignment pin;

a spacer having the predetermined width positioned between the first and second bars defining an alignment slot having the appropriate width to snugly accomodate another workpiece alignment pin;

a plurality of screws to firmly fasten the second bar to the first bar through the spacer and spacer segments; and

at least one filler plate fastenable to the worktable, wherein the filler plate may be removed from the worktable independent of the first bar to provide access to the worktable without disturbing the position of the alignment hole and alignment slot.

4,421,306

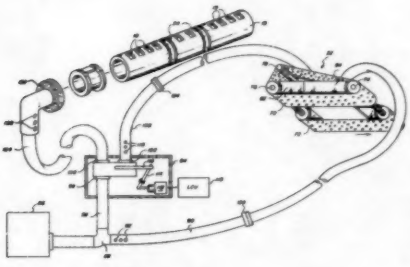
DOCUMENT FEEDER WITH IMPROVED VACUUM SYSTEM

Richard S. Muka, Huntington, Conn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 2, 1981, Ser. No. 269,167

Int. Cl.³ B65H 5/22, 3/10

U.S. Cl. 271—5 **3 Claims**



1. In a vacuum system for a document feeder, the feeder being useful for feeding seriatim a plurality of document sheets along a path having (1) a first portion extending from a stack of such sheets to an exposure position, wherein the sheets are registered and copied, and (2) a second portion leading away from the exposure position, the feeder having an oscillating vacuum member for removing a sheet from the stack and initiating movement of the removed sheet along the first portion of the path and at least one vacuum belt for receiving a sheet removed by the vacuum member and for advancing the sheet along the first portion of the path toward the exposure position, the improvement comprising:

a first vacuum plenum and a second vacuum plenum positioned adjacent said belt along the first portion of the sheet path so that a sheet can be attracted to the belt for transport along the first portion of the path when a partial vacuum exists in at least one of said plenums, the first plenum being located along said path between the second plenum and the vacuum member;

a vacuum blower;

a control valve having an inlet port coupled to said blower, said valve having a first outlet port coupled to the vacuum member and a second outlet port coupled to said first plenum, said valve being adjustable between (1) a first position wherein the vacuum member is connected to the blower to establish a partial vacuum in the vacuum member and (2) a second position wherein the first plenum is connected to the blower to establish a partial vacuum in the first plenum;

a conduit interconnecting said blower and said second plenum so that operation of the blower is effective to establish a partial vacuum in said second plenum; and

control means for operating said valve in a programmed sequence wherein (1) the valve is in its first position to establish a partial vacuum in the oscillating vacuum member for feeding a sheet from a stack and into the first portion of the path and (2) the valve then is adjusted to its second position to establish a partial vacuum in the first plenum to hold the sheet against the belt while the belt moves the sheet along the first portion of the path until the sheet falls under the influence of vacuum in the second plenum.

4,421,307

FOLDING EXERCISING EQUIPMENT

Ian J. Cunnington, Grouville, and Harold R. Evans, St. Brelade, both of Channel Islands, assignors to Tekron Licensing BV, De Leersum, Netherlands

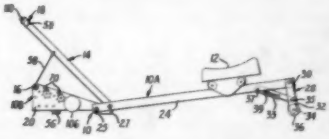
PCT No. PCT/GB80/00097, § 371 Date Feb. 4, 1981, § 102(e) Date Jan. 27, 1981, PCT Pub. No. WO80/02647, PCT Pub. Date Dec. 11, 1980

PCT Filed Jun. 4, 1980, Ser. No. 232,026

Claims priority, application United Kingdom, Jun. 4, 1979, 7919335

Int. Cl.³ A63B 69/06

U.S. Cl. 272—72 **9 Claims**



1. Exercising equipment comprising an elongate frame, a foot rest mounted on the frame near one end, a seat mounted on the frame at a distance from the foot rest, a handle arranged to be moved by a user of the equipment, and means arranged to oppose such movement of the handle in which the handle comprises a bar which is pivoted at one end to the frame about a horizontal axis transverse to the length of the frame, and carries a handgrip at or near its other end so that said handgrip is constrained to move in a predetermined path with at least a component of movement parallel to the length of the frame, in which the means opposing movement of the handle includes a flexible elongate friction element extending between the handle and the frame, a guide system over which the flexible element slides frictionally upon movement of the handle and tensioning means acting on the flexible element to oppose movement of the handle away from said foot rest, and in which the frame comprises front and rear portions which are connected together by a hinged joint having its axis horizontal and transverse to the length of the frame and close to the pivot axis of the handle so as to be collapsible from an operative position in which they lie generally in alignment and end to end and a storage position in which they partially overlap so as to substantially reduce their overall length.

4,421,308

BICYCLE EXERCISE STAND

Gerald A. Nagy, 6731 Rockdale, Dearborn Heights, Mich. 48127

Filed Dec. 14, 1981, Ser. No. 330,711

Int. Cl.³ A63B 69/16

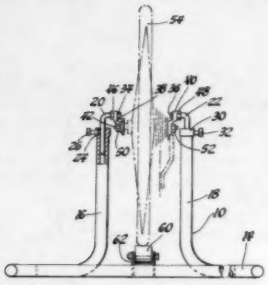
U.S. Cl. 272—73 **5 Claims**

1. An exercise stand for a bicycle having a driven wheel carried on a rear axle, comprising:

base means including a pair of parallel tubular members spaced a sufficient distance for receiving the driven wheel of the bicycle between them, said tubular members each having respective pin-receiving opening means;

a pair of elongated pin means, each of said pin means having a first end and a second end disposed at right angles, the first end of each pin being threaded;

bracket means for attaching said pin means to the ends of the rear axle of the bicycle, such that the second ends thereof are disposed in a spaced parallel relationship on opposite ends of the wheel axle, a distance accommodating the distance between the pin-receiving opening means of the tubular members, the second ends thereof being receivable in said pin-receiving openings;



means engageable with the first ends of the pin means for adjusting the position of the wheel between the tubular members;

collar means receiving the pin means and mounted on the ends of the tubular members;

fastener means on each of the collar means for connecting same to the pin means at an adjusted vertical position; and

a roller member mounted on the base means for rotation a distance generally corresponding to the radius of the bicycle wheel to resist rotation thereof.

4,421,309

MODULAR BOWLING LANE SYSTEM

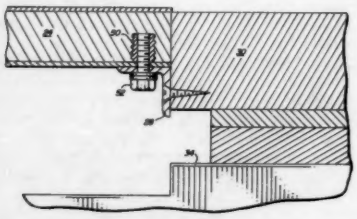
Will Heddon, P.O. Box 3416, Lake Wales, Fla. 33853

Continuation-in-part of Ser. No. 47,357, Jun. 11, 1979. This application Nov. 10, 1980, Ser. No. 205,611

The portion of the term of this patent subsequent to May 26, 1998, has been disclaimed.

Int. Cl.[3] A63D *1/04*

U.S. Cl. 273—51 **18 Claims**



1. In a bowling alley having a lane, leveling strips positioned below and perpendicular to the lane, and lane support structure positioned below the leveling strips and parallel to the lane, a modular lane system comprising:

a. a rectangular deck having an end and upper and lower surfaces, said deck formed from a plurality of hardwood strips adhesively bonded side to side in a single layer to form a lane module;

b. means coupled to said module and to said leveling strips for supporting said module at a predetermined distance above said lane support structure;

c. a coupler bar positioned below one end of said module for coupling the end of said module to an adjacent section of said lane and for preventing relative vertical displacement between said module and said adjacent section of said lane, said coupler bar comprising:

(i) a vertical face including a plurality of passageways for receiving first securing means to attach the vertical face of said coupler bar to the end of said adjacent lane section; and

(ii) a horizontal face including a plurality of passageways for receiving second securing means to attach the horizontal face of said coupler bar to the lower surface of said module.

4,421,310

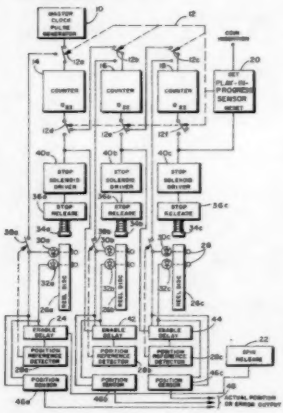
METHOD AND APPARATUS FOR RANDOMLY POSITIONING INDICA-BEARING MEMBERS

David E. Williams, Reno, Nev., assignor to Summit Systems, Inc., Canoga Park, Calif.

Filed Sep. 17, 1979, Ser. No. 76,147

Int. Cl.[3] A63F *5/04*

U.S. Cl. 273—143 R **9 Claims**



5. A method of randomly stopping a spinnable indicia-bearing reel, each indicium on said reel being associated with a specific numerical count and being arranged to periodically pass a particular position, comprising the steps of:

(a) providing a code comprising a number of code elements associated with the reel, the code having individual code element combinations for each indicium on the reel, said code element combinations being arranged in a pattern which is repeated around the disc, the possible number of code element combinations being less than the number of individual indicium on the reel whereby at least some code element combinations are used more than once;

(b) arranging said code element combinations with respect to the indicium whereby one specific code element combination sequence occurs at only one reference region of the reel, and whereby the code element combinations associated with any at least three successive indicium are different from each other;

(c) sensing said code element combinations as the reel rotates and determining angular position of the reel from the reference region as a result thereof;

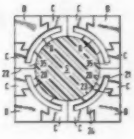
(d) initiating an action to stop the reel when the reel angular position corresponds with a predetermined position; and

(e) detecting whether the reel actually stopped in said predetermined position by determining whether the code element combination corresponding to the actual stopping position corresponds with the predetermined position.

4,421,311
PUZZLE-CUBE

Peter Sebesteny, Hamburg, Fed. Rep. of Germany, assignor to Ideal Toy Corporation, Hollis, N.Y.

Filed Jan. 29, 1982, Ser. No. 343,732
Claims priority, application Fed. Rep. of Germany, Feb. 3, 1981, 3103583
Int. Cl.³ A63F 9/08
U.S. Cl. 273—153 S 10 Claims



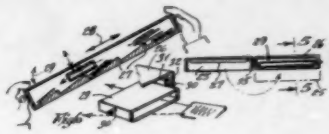
1. A puzzle cube comprising a cube body, each side of which is composed of 16 cube elements including corner cube elements, intermediate cube elements positioned between the corner cube elements and center cube elements, each of the cube elements having cams thereon and each being adapted for rotation relative to the remaining portion of the cube body about the center axes of the cube body respectively offset by 90 degrees, and a structural support member positioned inside the cube body with which the center cube elements, which with respect to the associated cube sides, cooperate, while the corner and intermediate cube elements are provided with cams at the inner surfaces thereof which engage behind guiding surfaces of the other cube elements, with the cams of the corner cube elements cooperating with cams and guiding surfaces of the adjacent intermediate cube elements, characterized in that the structural support member comprises an inner spherical core having eight spherical guiding elements arranged thereon in uniformly spaced arrangement, said guiding elements being connected to said spherical core by web members and forming concentrically extending guiding channels in three diameter planes extending perpendicularly with respect to each other and in which the cams of the center cube elements with respect to one cube side engage and are guided along a circular path defined by the guiding channels, the cams of the intermediate cube elements adjacent the center cube elements gripping behind undercut guiding surfaces of the center cube elements which define a circular path, and blocking means associated with one half of the structural support member such that the cube elements associated with this half of the support member are capable of being rotated relative to the remaining cube elements attached to the structural support member.

4,421,312
FOLDABLE BOARD GAME WITH CARD SHUFFLER

Pedro R. Delgado c/o George Spector, and George Spector 10007 both of 3615 Woolworth Bldg., 233 Broadway, New York, N.Y. c/o Pedro R. Delgado

Filed Apr. 23, 1982, Ser. No. 371,319
Int. Cl.³ A63F 3/00
U.S. Cl. 273—236 3 Claims

1. A new Banka game, comprising in combination, a gameboard, a deck of playing cards having playing instructions printed thereupon, and a plurality of chips, said playing instructions informing where said chips are placed upon or removed from said gameboard or to and from other players of said game, said gameboard including a fold line across a center thereof, a playing area imprinted on one side of said gameboard and being divided into spaces, said gameboard additionally comprising a boxlike case and cover which are pivotally joined along said fold line to form a box when closed together so to form an enclosure therebetween for shuffling said cards there-

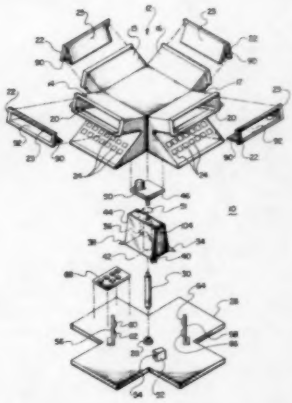


within, said boxlike case having a series of riffles inside said enclosure, and behind which said cards settle in a re-aligned arrangement when said box is closed, and means for selective said cards only becoming settled behind said riffles.

4,421,313
DISPLAY SYSTEM HAVING MULTIPLE VIEWING STATIONS

Richard S. Chang, Rolling Hills Estates, and Jan B. Chodak, Rancho Palos Verdes, both of Calif., assignors to Mattel, Inc., Los Angeles, Calif.

Filed Dec. 15, 1981, Ser. No. 331,118
Int. Cl.³ A63F 9/00
U.S. Cl. 273—237 12 Claims



1. A display system of the type including player response devices and individual viewing stations for presenting information to be viewed at multiple viewing stations, comprising:

a housing having openings to form the viewing stations;

single character generator means mounted within the housing and used to generate characters which act to present information at any of the viewing stations;

a mirror mounted within the housing;

means for rotating the mirror about an axis to provide a reflective light path from the character generator means to the openings;

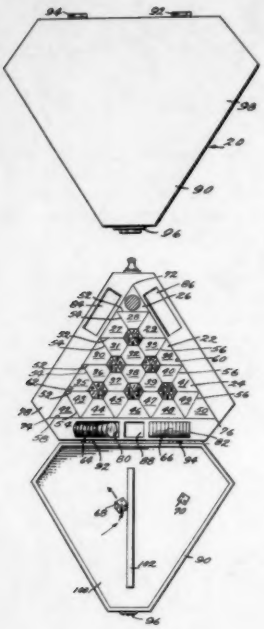
means located relative to said mirror rotating means for determining the position of the mirror; and

means for preventing players at other viewing stations from receiving the information presented at a viewing station, including means responsive to the position of the mirror for activating the character generator at predetermined positions of the mirror which provide a reflective light path from the character generator means to the opening at a desired one of the viewing stations.

4,421,314
BOARD GAME APPARATUS

Roger Stancill, 4019 Byrd Rd., Kensington, Md. 20895

Filed Jun. 28, 1982, Ser. No. 392,631
Int. Cl.³ A63F 3/00
U.S. Cl. 273—249 19 Claims



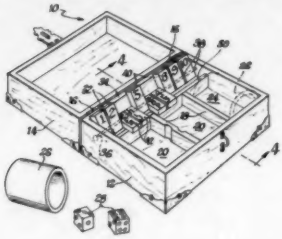
1. Game apparatus, comprising:
a game board defining a triangular playing surface;
said playing surface defining a predetermined number of triangular areas formed by three groups of spaced parallel lines, each group of lines being parallel to a respective edge of said playing surface;
said triangular areas defining a plurality of overlapping hexagons, each of said hexagons formed by six of said triangular areas positioned to have a common apex;
each of said hexagons having each of said six triangular areas within said hexagons marked with one of six different numbers;
plural sets of distinguishable playing pieces, each player being assigned the pieces from one set; and
means for indicating by chance one of said numbers for controlling movement of said playing pieces on said game board in accordance with the rules of said game apparatus.

4,421,315
GAME

Alfred Cutler, 17657 Pomerado Rd., #252, Rancho Bernardo, Calif. 92128

Filed Jan. 3, 1983, Ser. No. 455,072
Int. Cl.³ A63F 3/00
U.S. Cl. 273—268 5 Claims

1. A Game comprising:
a case;
a random number generator stored in said case;
a plurality of paddles whose total number is lesser than the number of letters in the alphabet;
said paddles being pivotally mounted in said case in a sequence;
said paddles having first and second stable positions in which the first and second sides of same are respectively exposed to the user;
said first sides each displaying a numeral such that the aggregate of said numerals are consecutive in said sequence;
said second sides each displaying at least one alphabetical letter such that said paddles can be flipped by the player into the second position responsive to numbers obtained

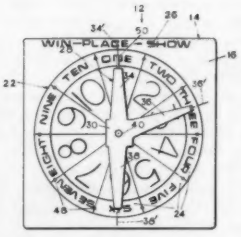


from the random number generator in an attempt to make a word from the letters displayed on the second sides of said flipped paddles; wherein said second sides together display the entire alphabet; and
said paddles are limited to ten, and the first side of each of said paddles displays one of the numerals from "1" through "10", the first and last paddle in said paddle sequence displaying the letters "A" and "Z", respectively, and the other paddles in the sequence each displaying three alphabetically sequential letters; and
wherein said random number generator comprises at least one die.

4,421,316
THREE-FINGERED SPINNER GAME OF CHANCE

William F. Brown, 6215 S. Wabash Ave., Apt. 506, Chicago, Ill. 60637

Filed Mar. 23, 1981, Ser. No. 246,395
Int. Cl.³ A63F 3/00
U.S. Cl. 273—274 1 Claim



1. A game of chance simulating a horse race and betting thereon comprising,
a wheel including a table having a dial thereon with a circumferential series of areas each having indicia thereon identifying a respective one of a plurality of horses,
a spinner on the table cooperating with the dial and having a hub, and three fingers extending radially in overlying relation to the indicia identifications of the horses and thereby effective for indicating respective ones of the horses, the fingers extending to positions closely adjacent the periphery of the dial and being angularly spaced apart

for indicating different horses for Win, Place and Show positions, and the spaces between the fingers enabling visualization of the selections by players in a group,

a combinations chart of indicia identifying combinations of indicia of horses, each combination including Win, Place and Show horses in correlation to the combinations indicated by the spinner for every position of the spinner, and the combinations of indicia in the combinations chart for Win being arranged in sequence according to the sequence of indicia representing horses on the dial with the combinations for each Place and Show being arranged with respect to Win according to the spacing of the indicia indicated by the fingers of the spinner, the combinations chart being of such size and proportions as to enable players in a group to read it at a glance, and

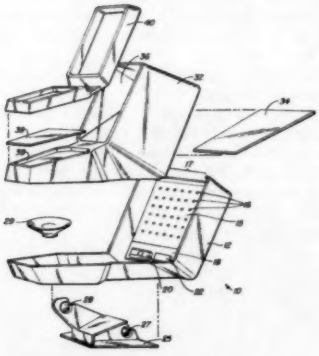
a game board displaying the indicia identification of all the horses and the odds for payment on each, in each Win, Place and Show position, the game board being of such size and proportions as to enable the players to place bets thereon.

4,421,317

ELECTRONIC GAME APPARATUS USING A THREE-DIMENSIONAL IMAGE

Roger D. Hector, San Jose, and Harry H. Jenkins, Jr., Menlo Park, both of Calif., assignors to Atari, Inc., Sunnyvale, Calif.

Filed Jan. 6, 1981, Ser. No. 222,839
Int. Cl.³ A63F 9/00
U.S. Cl. 273—313 **39 Claims**



26. Electronic game apparatus comprising:

a base including an opening;

a three-dimensional image stored on a plate as a hologram;

illumination means for angularly illuminating the plate to enable viewing of the three-dimensional image through the opening; and

game playing means for controlling the illumination means.

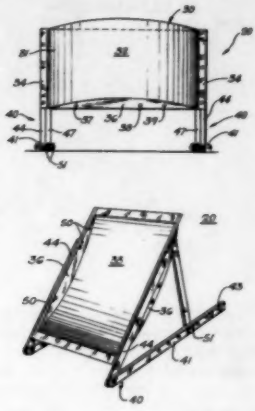
4,421,318

ADJUSTABLE REBOUND APPARATUS

David Sverdlik, 6428 N. Mozart, and Arnold I. Vodovozov, 2858 W. Touhy Ave., Unit A, both of Chicago, Ill. 60645

Filed Apr. 1, 1982, Ser. No. 364,260
Int. Cl.³ A63B 69/00, 71/02
U.S. Cl. 273—395 **12 Claims**

1. A reversible ball rebound apparatus comprising a part-cylindrical rebound member having a continuous, uninterrupted and imperforate concave rebound surface on one side thereof and a continuous, uninterrupted and imperforate, convex rebound surface on the opposite side thereof, means for supporting said rebound member, and means for reversibly securing said rebound member to said supporting means for selectively supporting same on said supporting means with either said convex rebound surface or said concave rebound



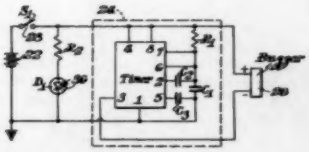
surface disposed forwardly without obstruction of the forward rebound surface by said supporting means.

4,421,319

HUNTING ARROW WITH LOCATING MEANS

Michael R. Murphy, 550 S. DuPont Pkwy., Wilmington, Del. 19720

Filed Feb. 1, 1983, Ser. No. 462,937
Int. Cl.³ F41B 5/02
U.S. Cl. 273—416 **8 Claims**

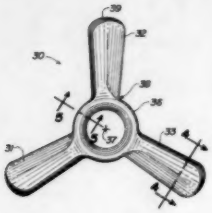


1. A hunting arrow including a nock having a hollow cavity with arrow locating means disposed therein, the arrow locating means including a normally open electrical circuit having a power source, time delay means, means for producing an audible signal upon expiration of the time delay countdown, and switch means adapted to close the electrical circuit extending from inside the cavity to the outer side of the nock whereby upon actuation of the switch means the time delay means starts its countdown and upon expiration thereof the means for producing an audible signal is energized whereby an audible signal pinpoints the location of the arrow.

4,421,320
BOOMERANG

David P. Robson, 4602 Schenley Rd., Baltimore, Md. 21210

Continuation of Ser. No. 110,420, Jan. 7, 1980, abandoned. This application Apr. 13, 1982, Ser. No. 367,847
Int. Cl.³ A63B 65/08
U.S. Cl. 273—425 6 Claims



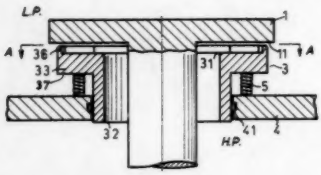
1. In a boomerang with a plurality of airfoil-shaped arms spaced about a central axis and extending outwardly thereabout the improvement wherein:

the boomerang has a top surface and an opposing bottom surface and an airfoil-shaped lift producing control means interconnecting said plurality of arms, said control means being generally open-centered and symmetrical about said central axis, said airfoil-shaped arms providing a net lift toward said top surface, said control means providing a net lift toward said bottom surface for controlling lay down.

4,421,321
HYDRODYNAMIC NON-CONTACTING SEAL FOR ROTARY MACHINES

Abraham Lipschitz, 68 Jabotinsky St., Nahariya, Israel 22385

Filed Mar. 10, 1983, Ser. No. 474,026
Claims priority, application Israel, Mar. 19, 1982, 65289
Int. Cl.³ F16J 15/34
U.S. Cl. 277—3 8 Claims

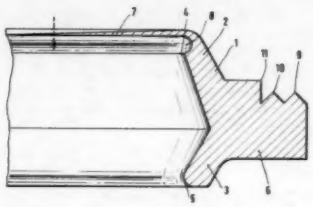


1. A hydrodynamic seal for a rotary machine, adapted to separate a low-pressure space from a high-pressure space in said machine filled with a liquid, said seal comprising: a rotating member having its smooth surface passing across a stator surface in close proximity; said stator surface being provided with a plurality of spaced-apart weirs rising above said stator surface and extending between the low-pressure space and the high-pressure space substantially perpendicular to the velocity vector of said rotating member, said weirs, of a predetermined length and breadth, having their height above said stator surface increasing from a minimum at their upstream side to a maximum at their downstream side, each sector of said stator surface between adjacent weirs being divided into a high-pressure zone and a low-pressure zone by a ridge rising above said stator surface to a height not less than the maximum height of said weirs, and extending from the low-pressure end of each weir to the high-pressure end of the adjacent weir downstream thereof.

4,421,322
COMBINATION KNIFE-EDGE AND AREAL CONTACT LIP SEAL FOR MOVABLE ELECTRODES

Jean Ruch, Brilon, and Josef Nelles, Meschede, both of Fed. Rep. of Germany, assignors to Accumulatorenwerke Hoppecke Carl Zoellner & Sohn GmbH & Co. KG, Brilon, Fed. Rep. of Germany

Filed Aug. 20, 1981, Ser. No. 294,697
Claims priority, application Fed. Rep. of Germany, Aug. 28, 1980, 3032445
Int. Cl.³ F16J 15/06
U.S. Cl. 277—12 17 Claims



1. In a galvanic metal-air cell having a housing formed with an opening through which a movable electrode extends, the latter having a periphery and an end front surface, an electrolyte chamber being defined partly by the front surface of the electrode and being sealed by an annular lip seal of elastic material which is mounted in said housing engaging sealingly against said electrode, the improvement in said lip seal wherein the lip seal comprises

at least one annular sealing lip with a substantially radially inwardly directed knife-like edge sealing ridge, in an installed condition in the housing, engaging against the periphery of the electrode, and

a membrane-like protective lip extending from and in front of said sealing ridge and in the installed condition extending axially into said electrolyte chamber and pressingly engaging with areal contact against a surface area of the periphery of said electrode.

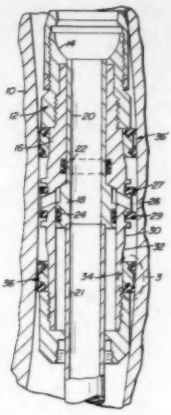
4,421,323
OIL WELL STRING MEMBER WITH STATIC SEAL

John A. Burke, Rocky River, Ohio, assignor to Greene, Tweed & Co., Inc., North Wales, Pa.

Filed Aug. 30, 1982, Ser. No. 413,041
Int. Cl.³ F16J 15/06; E21B 19/10
U.S. Cl. 277—12 10 Claims

1. Apparatus comprising a member having a cylindrical outer periphery, said outer periphery having first and second cylindrical surfaces axially spaced and connected by a tapered ramp, said surfaces being radially inwardly of said periphery with said first surface having a smaller diameter than said second surface, a seal assembly along said first surface, an end face of said assembly remote from said ramp being arranged to respond to fluid pressure for moving the assembly across the ramp to the second surface, said assembly being arranged to

expand in a radially outward direction as it moves across the ramp so that a central portion of its periphery projects beyond



the periphery of said member when said assembly is disposed along said second surface.

4,421,324

SHAFT SEAL DEVICE FOR SUBMERSIBLE MOTOR

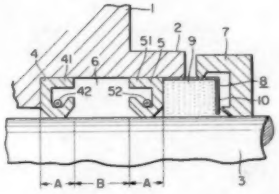
Sakuei Yamamoto; Hiroshi Inao; Kiyonori Tokumitsu; Mitsuhiro Nishida, and Sadahiro Kumamoto, all of Fukuoka, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed May 9, 1983, Ser. No. 492,673

Claims priority, application Japan, May 14, 1982, 57-71632[U]

Int. Cl.³ F16J *15/32, 15/40*

U.S. Cl. 277—24 **5 Claims**



1. A shaft seal device for a submersible motor, comprising:

a seal box which is provided at an end part of a case of the motor;

a pair of lip type shaft sealing members which are disposed between an inner surface of said seal box and a rotary shaft of the motor and whose lips are arranged so as to inwardly face each other with a spacing therebetween;

a lubricant which is stored in an interspace defined between said shaft sealing members;

an auxiliary refuse remover which adjoins an outer side of one of said shaft sealing members and which is snugly inserted between the inner surface of an end part of said seal box and the rotary shaft of the motor;

said auxiliary refuse remover being composed of a fitting, and a soft material member which is received in said fitting and which is snugly positioned on the rotary shaft of the motor; and

another refuse remover which is disposed so as to adjoin an outer side of said auxiliary refuse remover.

4,421,325

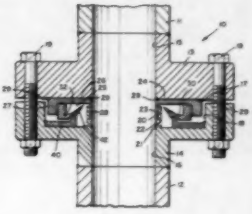
SEAL WITH DUAL METALLIC RINGS HAVING CONTACTING LIPS

Pellegrino E. Napolitano, Middletown, N.J., assignor to Hudson Engineering Company, Bayonne, N.J.

Filed Dec. 16, 1982, Ser. No. 450,367

Int. Cl.³ F16J *15/28, 15/32, 15/48*

U.S. Cl. 277—27 **12 Claims**



1. A seal for use with fluid-carrying elements of a fluid system which define a portion of a fluid passageway, said seal comprising:

(a) a first annular ring secured to one of said elements in substantially fluid-tight relationship therewith and spaced radially outwardly of said flow passageway, said first annular ring including a first inwardly directed lip disposed at an angle to the axis of said passageway;

(b) a second annular ring secured to the other of said elements in substantially fluid-tight relationship therewith and spaced radially outwardly of said flow passageway, said second annular ring including a second inwardly directed lip disposed at an angle to the axis of said passageway; and

(c) said first inwardly directed lip contacting said second inwardly directed lip at least at the innermost portion thereof relative to the fluid passageway axis.

4,421,326

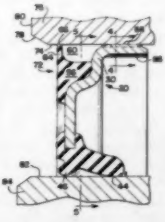
OIL SEALS WITH MOUNTING SURFACE VENT MECHANISMS

Gordon T. Drygalski, 5451 N. East River Rd., Chicago, Ill. 60656

Filed Sep. 29, 1982, Ser. No. 427,826

Int. Cl.³ F16C *33/78*

U.S. Cl. 277—50 **15 Claims**



1. A fluid seal unit comprising, in combination, an annular casing portion and a first annular elastomeric seal body portion, said casing being made at least in part from a relatively rigid material, and having axially and radially extending flanges, with at least a portion of said axial flange being adapted for snug, fluid-tight engagement with an associated portion of a sealed mechanism, and with a portion of said radial flange being a bonding portion to which said first elastomeric seal body is secured, said first seal body including generally frustoconical air and oil side surfaces meeting each other along

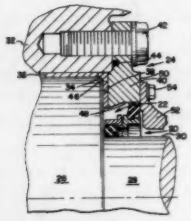
a generally circular locus to define a primary seal band adapted to engage a portion of the sealed mechanism with which the seal is associated in use, a second elastomeric seal body attached to at least one of said axial and radial flanges and adapted to form, in combination therewith, and at least partially circumferentially extending manifold groove, a portion of said second body further defining a resilient diaphragm portion of thin cross section which is adapted to be displaced under fluid pressure to move between sealed and opened positions and having a portion adapted to lie in a normally closed position in contact with a portion of said associated sealed mechanism in fluid sealing engagement therewith, and at least one axially extending vent passage formed in an axially extending flange portion of said seal unit and adapted to provide a path of fluid communication between the interior of said sealed region and said manifold groove, whereby fluid pressure in excess of a predetermined level may be released by passage of said fluid through said axial vent, into said manifold, and outwardly therefrom by displacement of said diaphragm portion.

4,421,327

HEAVY DUTY END FACE SEAL WITH ASYMMETRICAL CROSS-SECTION

James P. Morley, 461 S. Dunton, Arlington Heights, Ill. 60005, and Burton K. Olsson, 420 Courtland, Park Ridge, Ill. 60068

Filed Dec. 17, 1981, Ser. No. 331,680
Int. Cl.³ F16J *15/16*
U.S. Cl. 277—84 **12 Claims**



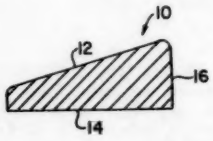
1. A mechanical end face seal assembly comprising, in combination, first and second, relatively rigid, generally annular, primary seal rings, each adapted to cooperate with an associated secondary seal ring to form said mechanical end face seal assembly, each of said primary rings having a body portion which comprises an axially extending flange and a radially extending flange, said flanges being arranged so that said body portion has a generally T-shaped cross-section, with said radial flange having an outer end face surface and a pair of inner end face surfaces, said inner end face surfaces being spaced radially apart from each other, said axial flange having an outer, axially extending, radially outwardly directed surface and an inner, axially extending, radially inwardly directed surface lying parallel to and spaced apart from said outer surface, said outer end face of said radially extending flange on said first primary ring having an exterior portion thereof finished so as to cooperate with an oppositely directed, counterpart surface on said second primary ring to form a primary seal band area, one of said axially extending surfaces on each of said second primary rings cooperating with one of said inner end face surfaces to form a seat defind by substantially perpendicularly related surfaces and being adapted to receive and position therein a portion of a secondary seal ring, and a pair of secondary elastomeric seal rings, each being annular and having a body portion adapted to provide, in use, a combination of radial compressive load and axial end face load to said seal assembly, each of said secondary rings having generally cylindrical, spaced apart, inner and outer diameter surfaces adapted to cooperate respectively with one of said inner and outer axially extending surfaces on said primary seal ring and an associated machine part, said inner and outer surfaces being, in the relaxed condition of said secondary rings, axially offset from each other, said secondary seal bodies further including axially inner and outer surfaces having inclined portions joined at their ends to said cylindrical surface portions so that at least portions of said seal bodies are of generally parallelogram shaped cross-section, said first and second primary rings and the first and second of said pair of secondary rings being constructed and arranged respectively for association with each other such that said seal bands abut each other and so that one of said secondary seal members extends outwardly from the radially outer axial surface of said primary seal ring and so the other secondary ring extends radially inwardly from the radially inner axial surface of said primary ring, with portions of each of said outer inclined surfaces of said secondary rings being adapted, under load, to engage one of said inner axial surface on its associated primary ring for application of said end face load to said primary seal ring.

4,421,328

HALF-KEYSTONE COMPRESSION RING

Kent W. Thurston, Timonium, and Jesse H. Barnes, Severna Park, both of Md., assignors to Koppers Company, Inc., Pittsburgh, Pa.

Filed Sep. 29, 1982, Ser. No. 428,215
Int. Cl.³ F16J *9/20*
U.S. Cl. 277—216 **1 Claim**



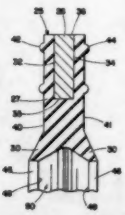
1. An improved half-keystone compression ring for use in an internal combustion engine, the improvement comprising an essentially flat bottom side of said ring when said ring is in the closed operating position, said bottom side forming a nominal angle of between 0° and plus or minus 8' with a horizontal surface.

4,421,329

SPLIT DUAL LIP SEAL FOR GEAR CASE

Jerry G. Jelinek, La Habra, Calif., assignor to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Sep. 22, 1982, Ser. No. 421,636
Int. Cl.³ F16J *15/48*
U.S. Cl. 277—178 **7 Claims**



1. A two-piece sealing member for mounting in a split circular channel surrounding a rotatable shaft, each sealing member piece comprising

a metal retainer in a generally half-ring configuration, and

an elastomeric seal bonded to said retainer over the full inner periphery thereof, said seal comprising a body portion having a cross-sectional configuration conforming to the shape

of said support channel and adapted for a snug fit therein so as to be constrained against radially outward movement and restrained against circumferential movement relative thereto by said support channel, and a pair of divergent legs disposed radially inwardly of said body portion, said legs having sealing edges at the radially inner ends thereof adapted for engagement with said rotatable shaft, said legs being adapted for deflection axially with respect to said body portion to place a light seating bias on said sealing edges when said split circular channel is moved to a mounting location surrounding said shaft, said legs having projecting portions at either end extending circumferentially greater than 180 degrees so as to engage corresponding projecting portions of said other sealing member piece, whereby said projecting portions may be circumferentially compressed by the constraint of said channel to establish a fluid tight seal about the periphery of said rotatable shaft, said pair of divergent legs being symmetrical with respect to said body portion so that said sealing member is reversible in said channel.

4,421,330

ANTIFRICTION FLUID SEAL ASSEMBLY

John A. Burke, Rocky River, Ohio, assignor to Greene, Tweed & Co., Inc., North Wales, Pa.

Filed Feb. 8, 1982, Ser. No. 346,701

Int. Cl.³ F16L *17/00, 21/08;* **F16J** *15/32*

U.S. Cl. 277—188 R **5 Claims**

1. A seal assembly for use between inner and outer relatively movable members, wherein one of the members having a circumferentially extending groove defined by spaced radial walls for retaining the seal assembly, said seal assembly comprising:

(a) an annular sealing ring of resilient deformable material having a hardness in the range of about 60 to about 90 durometer to provide a low pressure seal, and a mating back-up ring of a low-friction material having a slight resilience to provide a high pressure seal;

(b) said sealing ring having two radially disposed side faces, a first side face defining the pressure side of the assembly, and a second side face on the opposite side of the assembly, said second side face being defined by the radial surface of an axially extending flange of said sealing ring, said radial surface adapted to cooperate with walls of a groove to define a generally rectangular space;

(c) said sealing ring having one of its peripheral surfaces defined by four contiguous portions, the first portion being generally semi-circular, the second portion being an angled surface extending from said first portion at an angle of between 10° and 40° with respect to a radius of said sealing ring, the third portion being an axially extending surface of said flange, and a fourth portion being a curved surface forming the intersection of said second and third portions;

(d) said sealing ring in an unstressed condition having a radial thickness greater than the radial thickness of said back-up ring, said sealing ring having a projection extending beyond a radial edge of said back-up ring, said projection being defined by the semi-circular portion of the peripheral surface of said sealing ring;

(e) said back-up ring being trapezoidal in cross-section and radially disposed with respect to the third portion of said sealing ring, a side face of said back-up ring being a surface angled inward between 50° and 70° with respect to the axis of said back-up ring and cooperating with the second and fourth portions of said sealing ring to define a triangular space, with the apex of the triangular space being on a periphery of said assembly;

(f) said projection of said sealing ring having a volume less than the sum of the volumes of said rectangular space and said triangular space.

4,421,331

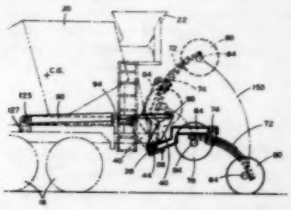
AUXILIARY LOAD-CARRYING APPARATUS

Tom E. Ferris, 4010 Wynn, Houston, Tex. 77017

Division of Ser. No. 903,861, May 8, 1978, Pat. No. 4,350,358. This application Sep. 2, 1982, Ser. No. 414,461

Int. Cl.³ B60P *1/00*

U.S. Cl. 280—81 R **14 Claims**



1. An auxiliary load-carrying means adapted for mounting on the rear of a vehicle for providing additional load support, comprising independently actuatable load-carrying devices disposed on opposing lateral sides of said vehicle, each of said load-carrying devices including a pair of wheel means, one disposed at the forward end and the other at the rear end of an interconnecting longitudinally extending support beam, linkage means having compound pivotal connections with said vehicle and each of said load-carrying devices to provide a combination of pivotally upward and downward movement of the load supporting device from ground engagement to raised position respectively free articulated movement between the frame and each load-carrying device for tracking during turning of the vehicle about a turning radius, reciprocable power means, one at each side of vehicle, and each including a hinged connection with a respective one of said load-carrying devices and which acts through said compound linkage to effect selectively raising and lowering movements of each of said auxiliary load-carrying devices.

4,421,332

INDIVIDUAL WHEEL SUSPENSION FOR NON-STEERED WHEELS OF MOTOR VEHICLES, ESPECIALLY AUTOMOBILES

Werner Kosak, Dachau, and Wolfgang Matschinsky, Munich, both of Fed. Rep. of Germany, assignors to Bayerische Motoren Werke, Fed. Rep. of Germany

Filed Nov. 16, 1981, Ser. No. 321,606

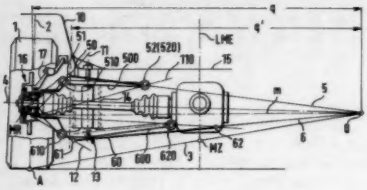
Claims priority, application European Pat. Off., Nov. 14, 1980, 80107072.3

Int. Cl.³ B60G *3/00*

U.S. Cl. 280—95 R **6 Claims**

1. An individual wheel suspension for a non-steered wheel of a motor vehicle, such as an automobile, comprising a trailing arm, connected with the vehicle body in an articulated fashion by means of a lengthwise arm disposed in the direction lengthwise of the vehicle and, in the direction transverse to the

vehicle, by two wishbone means, one located above the other, whereby each of the wishbone means includes auxiliary tie-rod means projecting in a transverse plane running vertically through the wheel center, the extension of said tie-rods, directed toward the center of the vehicle, intersecting at a transverse pole located at a distance from the wheel center plane, characterized in that the articulation of the end of each of the auxiliary tie-rod means proximate the wheel are provided in



the vicinity of the wheel center plane at an auxiliary distance from said transverse pole whereby each of the auxiliary tie-rod means is of a length which is shorter than or approximately equal to half the auxiliary distance, and in that the lengthwise arm is disposed so that it points toward the rear of said vehicle, with an articulation of the lengthwise arm to the vehicle body being located near the wheel center plane and beneath the center of the wheel.

4,421,333

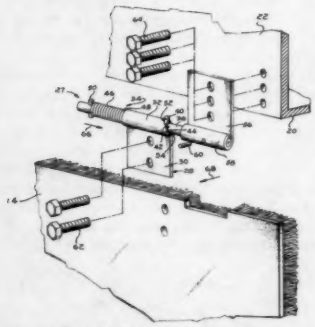
ASSEMBLY FOR MOUNTING A VEHICLE SPRAY SUPPRESSION DEVICE

James R. Van Dyke, Pensacola, Fla., assignor to Monsanto Company, St. Louis, Mo.

Continuation of Ser. No. 263,520, May 14, 1981, abandoned. This application Jun. 15, 1983, Ser. No. 504,076

Int. Cl.³ B62D *25/16*

U.S. Cl. 280—154.5 R **1 Claim**



1. A spray-suppression apparatus for a tractor-trailer adapted to be mounted on a forward portion of a trailer adjacent the upper outside surface of at least one rear tire of tractor comprising:

a side skirt having a height greater than the distance between the bottom edge of the trailer and the top of said tire; and

at least one hinge assembly for mounting said side skirt to said trailer in a position generally parallel to the side of said trailer whereby said side skirt occludes vertical space between said trailer and the top of said tire; said hinge assembly having a horizontal pivotal axis substantially parallel to a side of the trailer said hinge assembly having a spring-loaded cam urging the skirt toward a generally vertical orientation while allowing the skirt to pivot about said axis, wherein the lower edge of the skirt can pivot outwardly and upwardly toward a raised position when contacted by said tire of the trailer, said hinge assembly also having a detent for holding said skirt in a raised position.

4,421,334

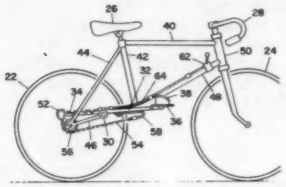
HIGH SPEED CYCLE

Boris Efros, 920 N. Stanley Ave., Los Angeles, Calif. 90046

Filed Nov. 16, 1981, Ser. No. 321,623

Int. Cl.³ B62M *1/04*

U.S. Cl. 280—236 **12 Claims**



1. A simplified pedal lever type cycle including positive power ratio changing and locking arrangements comprising:

a cycle including at least two wheels, one of which is a drive wheel, a seat, and means for steering the cycle,

two chain means for applying power to the drive wheel,

a pair of pedal levers each having a forwardly extending portion for receiving a person's foot and a rearwardly extending portion;

means for mounting said pedal levers for operation independently of one another, whereby they may be operated alternately, concurrently or singly at the option of the rider;

slider assembly means mounted on the rearwardly extending portion of each of said pedal levers for varying the power ratio of said bicycle, each slider assembly means being connected respectively to one end of one of said chain means,

the rearwardly extending portion of each of said pedal levers being provided with a set of notches for interaction with the respective associated slider assembly;

each said slider assembly having means for engaging said notches for determining the ratio for the application of power by said pedal levers to said drive wheel;

means for positively locking said slider onto a fixed position along the length of said rearwardly extending portion of said pedal lever;

angled means between said slider and said rearwardly extending portion of said pedal lever for disengaging said slider from a fixed position on said pedal lever;

means for remotely unlocking said locking means and causing movement of said slider assembly to a new position along the length of the rearwardly extending portion of said pedal lever, for remotely selecting the new position of said slider assembly, and for positively locking said slider assembly into its new position; and

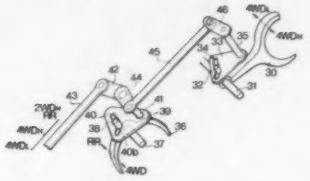
means for maintaining each said chain under tension, said means including spring means coupled between the other end of each said chain and the forwardly extending portion of one of said pedal levers.

4,421,335

CONTROL MECHANISM FOR A TRANSMISSION OF A FOUR-WHEEL DRIVE VEHICLE

Sadao Makishima, Akikawa, and Seiichi Iwata, Mizuhomachi, both of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 27, 1981, Ser. No. 315,561
Claims priority, application Japan, Oct. 31, 1980, 55-154415
Int. Cl.³ B60K *23/08*
U.S. Cl. 280—247 **17 Claims**



1. A control mechanism for a transmission of a four-wheel drive vehicle, comprising

a driving shaft adapted to be connected to a crankshaft of an engine through a first clutch means,

an auxiliary change-speed transmission provided adjacent to said driving shaft,

an input shaft of a main change-speed transmission provided adjacent to said auxiliary change-speed transmission,

said auxiliary change-speed transmission including reduction gear trains, a second clutch means manually operable for selecting transmission ratios of said auxiliary change-speed transmission for transmitting the output of said driving shaft to said input shaft, and a first fork means for shifting said second clutch means,

an output shaft provided in parallel with said input shaft, said main change-speed transmission provided on said input shaft and output shaft,

means for transmitting the output of said output shaft to front axles and to rear axles of the vehicle,

a third clutch means provided in said transmitting means for transmitting the output of said output shaft for selectively connecting and disconnecting, respectively, the transmitting of the output to either of the front or rear axles,

a second fork means for shifting said third clutch means,

an operation rod axially slidably provided for shifting said second clutch means in said auxiliary change-speed transmission and for shifting said third clutch means,

a rotatable first guide plate for said first fork means,

a rotatable second guide plate for said second fork means,

said first and second guide plates being operatively connected to said operation rod, each of said guide plates having a guide groove slidably engaged with a part of the corresponding said fork means, whereby by moving said operation rod said first and second fork means may be selectively shifted via said guide plates and said guide grooves.

4,421,336

VEHICLE FOR THE PARALYZED

Jerrold S. Petrofsky, Beavercreek, and Roger M. Glaser, Dayton, both of Ohio, assignors to Wright State University, Dayton, Ohio

Filed Sep. 14, 1982, Ser. No. 417,938
Int. Cl.³ A61G *5/02*; B62M *1/04*
U.S. Cl. 280—252 **14 Claims**

1. A vehicle for transporting a paralyzed person comprising:

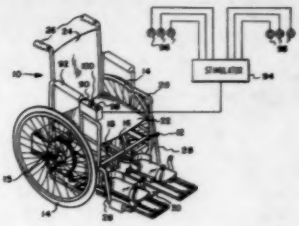
a support frame for carrying said person;

a plurality of wheels for carrying said support frame;

limb support means connected to said support frame for supporting a limb of said person;

drive means connected between said limb support means and at least one of said wheels for driving said vehicle in response to movement of said limb;

control means for generating a control signal; and



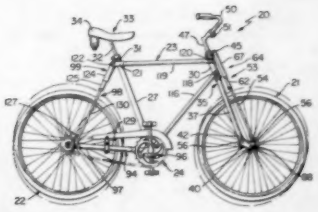
stimulation means responsive to said control signal for stimulating a muscle of said person to cause driving movement of said limb.

4,421,337

BICYCLE WITH RESILIENTLY YIELDABLE WHEEL SUPPORTS

Thomas A. Pratt, 7415 Baywind Dr., Cincinnati, Ohio 45242

Filed Jan. 8, 1982, Ser. No. 338,050
Int. Cl.³ B62K *25/08, 25/10*
U.S. Cl. 280—277 **27 Claims**



1. In a bicycle comprising; a front wheel; a rear wheel; a frame having a tubular forward portion; means mounting said frame on said wheels; a pedal assembly; a support structure supporting said pedal assembly on said frame; said mounting means comprising, a front axle for rotatably supporting said front wheel, a first fork assembly having a first tubular member rotatably mounted within said tubular forward portion, a first pair of front wheel embracing legs extending from the lower end of said first tubular member, a first pair of toggle links disposed on opposite end portions of said front axle, each toggle link of said first pair of toggle links having an inner end pivotally fastened to the lower end portion of an associated one of said first pair of legs and an outer end having opening means for receiving an associated end portion of said front axle, a top plate detachably fastened to said first tubular member for rotation therewith, a second fork assembly having a second pair of front wheel embracing legs, fastening means pivotally fastening an associated leg of said second fork assembly to an associated toggle link of said first pair of toggle links, attaching means for attaching said front axle to said first pair of toggle links with said front axle having its opposite end portions disposed within said opening means, said second fork assembly comprising a U-shaped singlepiece component having a bight and a pair of parallel legs, a second tubular member fixed to and extending upwardly from the center of said bight, and yielding means operatively connected between said top plate and said second tubular member, said yielding means allowing large and abrupt vertical movements of said front wheel while maintaining said frame comparatively free of said movements;

the improvement comprising a second pair of toggle links also disposed on opposite end portions of said front axle, each toggle link of said second pair cooperating with an associated toggle link of said first pair, each toggle link of said second pair also having an inner end pivotally fastened to the lower end portion of an associated one of said first pair of legs and an outer end having opening means for receiving an associated end portion of said front axle, said fastening means pivotally fastening an associated leg of said second fork assembly to an associated toggle link of said first pair of toggle links also serving to pivotally fasten the associated leg of said second fork assembly to an associated toggle link of said second pair of toggle links, and said attaching means also serving to attach said front axle to said second pair of toggle links with said front axle also having its opposite end portions disposed within said opening means in said toggle links of said second pair.

4,421,338

STRUCTURE OF AN UPPER FORK ASSEMBLY OF A MOTORCYCLE

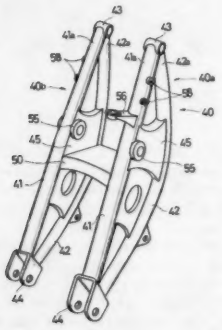
Tokio Isono, Tokyo, and Osamu Tanaka, Kamifukuoka, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 6, [illegible], Ser. No. 309,017

Claims priority, application Japan, Oct. 9, 1980, 55-141802

Int. Cl.³ B62K *19/10, 21/02*

U.S. Cl. 280—279 **4 Claims**



1. An upper fork for a front fork assembly of a motorcycle, comprising:

a pair of fork member units, and a bridge for interconnecting said pair of fork member units;

each of said fork member units including a substantially vertically extending front member formed of a pipe, a rear member extending along said front member and welded at upper and lower ends thereof to upper and lower ends of said front member, and a cross member welded to mid portions of said front member and said rear member to interconnect said front and rear members;

said bridge being welded to said front members, said rear members and said cross members of said pair of fork member units;

each of said cross members being formed as a closed hollow body with at least two plates; and

said bridge being formed to have a closed hollow body.

4,421,339

ARTICULATED VEHICLE, PARTICULARLY A BUS

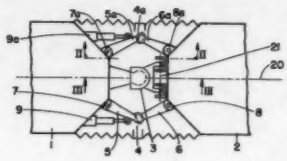
Faust Hagin, Münich, Fed. Rep. of Germany, assignor to M.A.N. Maschinenfabrik Augsburg Nurnberg Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jul. 27, 1981, Ser. No. 287,294

Claims priority, application Fed. Rep. of Germany, Aug. 8, 1980, 3030015

Int. Cl.³ B60D *5/00*

U.S. Cl. 280—460 R **6 Claims**



1. In an articulated vehicle, such as a bus, including a lead car and a trailer; a central ball joint arranged in the central plane of the vehicle coupling said lead car to said trailer; the improvement comprising: a shackle pivotally mounted about a horizontal transverse axis at the trailer and connecting said trailer to the ball joint; a pair of arms being arranged respectively, on either side of the central ball joint on the lead car and on the trailer for rotation about a vertical axis and further ball joints on each side of the vehicle for interconnecting the arms of the lead car and of the trailer, said further ball joints being arranged at the same level.

4,421,340

COUPLING MEANS COMPRISING A CENTERING DEVICE AND A LOCKING MECHANISM FOR A MOTOR DRIVEN UTILITY UNIT HAVING A COMPLEMENTARY UNIT

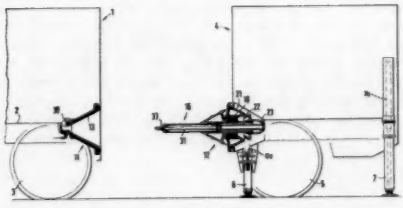
Volker Kramer, Erdmannhausen, and Günter Helsper, Münchingen, both of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Oct. 29, 1981, Ser. No. 316,533

Claims priority, application Fed. Rep. of Germany, Nov. 8, 1980, 3042160

Int. Cl.³ B60D *1/00*

U.S. Cl. 280—478 B **15 Claims**



1. A vehicle of the type having a motor driven vehicle unit and a wheeled complementary unit couplable thereto, comprising:

(a) a towing and coupling means between the vehicle unit and the wheeled complementary unit for enabling towing of the complementary unit by the vehicle unit, and operable to draw same together, said towing and coupling means being connected, at a first end, to said complementary unit by an elastic means for enabling pivoting therof, wherein said elastic means is disposed between a retaining member and a draft element;

(b) a locking means for securing a second, opposite end of

said towing and coupling means to said vehicle unit and forming a pivotal interconnection therebetween;

(c) drawing means mounted to said complementary unit for displacing the towing and coupling means, when it is secured to said locking means, between a first, extended, position, wherein said complemetary unit is towable behind said vehicle unit in an articulated manner and a second, retracted, position, wherein said complementary unit is drawn adjacent said vehicle unit and is towable rigidly coupled to said vehicle unit;

(d) centering means for centering said vehicle unit relative to said auxiliary hook-up unit, said centering means comprising a first and a second mating conical surfaced centering member which interengage positively, said first centering member being disposed on the vehicle unit, said second centering member being disposed on the complementary unit, said first centering member being operable to guide said towing and coupling means, and said second centering member is securable to said locking means; and

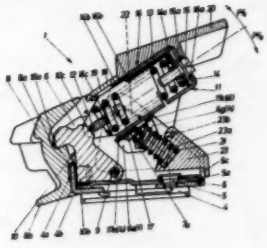
(e) securing means for fixedly securing said towing and coupling means in said retracted position and for rendering said elastic means inactive, after said complementary unit has been drawn adjacent said vehicle unit.

4,421,341

SAFETY SKI BINDING

Erwin Krob, and Helmut Bauer, both of Vienna, Austria, assignors to TMC Corporation, Baar, Switzerland

Filed May 21, 1981, Ser. No. 265,750
Claims priority, application Austria, May 23, 1980, 2769/80
Int. Cl.³ A63C *9/08*
U.S. Cl. 280—628 **27 Claims**



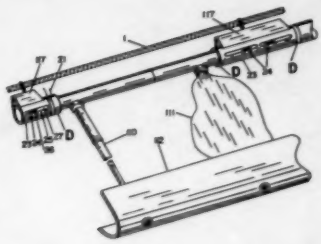
1. In a safety ski binding having a sole holder supported on a support member for pivotal movement about a horizontal first axis, said support member being supported on a base for pivotal movement about a vertical second axis, locking means for yieldably maintaining said sole holder in a downhill skiing position holding a ski shoe, said locking means including cooperating locking elements and yielding only when release forces applied to said sole holder exceed predetermined limits, at least one said locking element being provided on a carrier, the improvement comprising wherein said carrier is a locking lever pivotally supported on said support member and having on a side thereof remote from said one locking element a control surface, including a release lever supported on said support member for pivotal movement about a third axis, a release spring supported on said release lever, a slide member movably supported on said release lever and biased toward said control surface by said release spring, and wherein said release lever is pivotal against the force of a centering spring having one end supported on one of said support member and said locking lever and the other end supported on said release lever.

4,421,342

ROTARY ACTUATION DEVICE

Milton F. Brown, Jr., 2035 Echo Cove, Virginia Beach, Va. 23454

Continuation of Ser. No. 12,569, Feb. 15, 1979, abandoned. This application Jul. 22, 1981, Ser. No. 285,814
Int. Cl.³ B60R *21/06*
U.S. Cl. 280—740 **16 Claims**



1. An emergency rotary actuation device, including:

a. a pressure tube having a sealed chamber secured to one end thereof,

b. a piston positioned within said pressure tube, said piston having a shaft extending therefrom to the other end of said pressure tube,

c. a source of gas pressure contained within said chamber,

d. condition responsive electrically fired explosive means for initiating the substantially complete release of gas pressure from said chamber into said piston tube for longitudinally moving said piston within said pressure tube,

e. a first concentric tube extending from said other end of said pressure tube, at least a portion of said shaft extending into said first concentric tube, and said first concentric tube having a slot formed in the wall thereof and extending along a substantial portion thereof,

f. a second concentric tube concentrically mounted with respect to said first concentric tube, said second concentric tube having a slot formed in the wall thereof extending along the portion of the length thereof overlying the slot portion of the length of said first concentric tube,

g. one of said slots being straight and the other of said slots being helical,

h. at least one lug carried by said shaft and extending radially outwardly and engaging both of said slots,

i. means for preventing rotation of one of said tubes,

j. cylinder housing means concentrically and rotatably mounted about said pressure tube, said sealed chamber, and said condition responsive electrically fired explosive means,

k. rotation responsive operator means secured to said cylinder housing means, and

l. whereby upon actuation of said electrically fired explosive initiating means, said gas pressure forces said piston along said pressure tube and said shaft and said lug and cause relative rotation of said concentric tubes and operation of said operator means.

4,421,343

KNEE PANEL FOR FRONT SEAT AND KNEE PANEL MOUNTING STRUCTURE FOR VEHICLE

Noritada Yoshitsugu, and Atsuo Ando, both of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Dec. 11, 1980, Ser. No. 215,336
Int. Cl.³ B60R *21/04*
U.S. Cl. 280—752 **4 Claims**

1. A knee panel for a front seat of a vehicle, comprising:

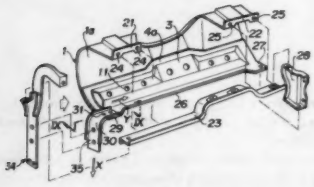
(a) a substantially horizontally extending panel element, having a substantially convex shape when viewed in a

longitudinal cross section of the vehicle, the convex outer surface of said element facing the front seat of the vehicle in the rearward direction of the vehicle, said panel element being securely fixed at an upper portion thereof to the lower portion of an instrument panel of the vehicle; of an instrument panel of the vehicle;

(b) a substantially horizontally extending, substantially rigid one-piece reinforcing member substantially longitudinally coextensive with said panel element, said reinforcing member having substantially a dish shape when viewed in a longitudinal cross section of the vehicle, said reinforcing member being securely fixed at its peripheral edges to the lower inner surface of said panel element; and

(c) a knee panel mounting structure comprising,

(i) a side bracket securely fixing and supporting said knee panel element at the outer side end of the lower edge thereof;



(ii) an L-shaped bracket having horizontal and vertical mounting portions, said horizontal mounting portion of said L-shaped bracket being securely fixed to the inner side end of the lower edge of said knee panel element;

(iii) a floor bracket attached to the floor of the vehicle at a center line portion thereof; and

(iv) a center line brace attached to said floor bracket, said center line brace being securely fixed to said vertical mounting portion of said L-shaped bracket,

said reinforcing member and said knee panel mounting structure cooperating to provide substantially rigid support to said knee panel element so that local deformation of said knee panel element upon impact with the knees of vehicle occupants is eliminated and the movement of the vehicle occupants' knees upon impact with the knee panel is thereby restricted.

4,421,344

PRESSURE-SENSITIVE RECORD COLOR-DEVELOPING SHEET

Hideo Ikezawa; Yoshiyuki Takahashi, and Hideaki Hashimoto, all of Tokyo, Japan, assignors to Oji Paper Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 184,465, Sep. 5, 1980, abandoned. This application Jul. 9, 1982, Ser. No. 396,849
Claims priority, application Japan, Sep. 5, 1979, 54-112776
Int. Cl.³ B41M *5/22*
U.S. Cl. 282—27.5 **6 Claims**

1. A pressure-sensitive record color-developing sheet comprising a substrate layer and a color-developing layer which has been formed by coating a surface of said substrate with an aqueous solution-dispersion which contains (A) an acid color-developing agent consisting of at least one member selected from the group consisting of activated clay and aluminum silicate, (B) an agent for promoting color-development and preventing color-fading, and (C) a binder, and which has a pH of from 6.5 to 10.0,

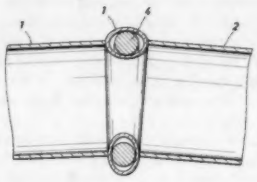
which sheet is characterized in that said color development-promoting, color fading-preventing agent comprises 1% to 100%, based on the weight of said acid color-developing agent, of at least one thiourea compound and 1% to 100%, based on the weight of said acid color-developing agent, of at least one zinc compound selected from the group consisting of zinc oxide and zinc hydroxide, the molar ratio of said thiourea compound to said zinc compound being in the range of from 0.5:1 to 20:1.

4,421,345

FLEXIBLE PIPELINE JOINTS

Ray R. Ayers, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Jun. 27, 1980, Ser. No. 163,557
Int. Cl.³ F16L *27/10*
U.S. Cl. 285—223 **4 Claims**



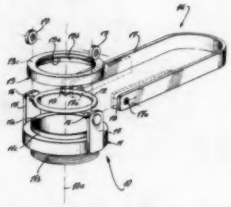
1. A flexible length of pipe comprising at least two pipe ends flexibly joined with a flexible metallic element which is circumferentially continuous toroidal shell-shaped and filled with a solid insert which limits deformation of the toroidal shell element caused by axial or bending loads in the pipe, said insert being a ring of varying cross-sectional area around the circumference thereof.

4,421,346

TUBE CONNECTOR

Alfred J. Seiler, 1700 Dumas-Vemont, Ville-de-Laval, Quebec, Canada

Filed Feb. 6, 1981, Ser. No. 232,211
Claims priority, application Canada, Feb. 7, 1980, 345354
Int. Cl.³ F16L *21/04, 55/00, 5/00, 19/00*
U.S. Cl. 285—346 **20 Claims**



1. A connector means for use in interconnecting a tube or the like to a further member, said connector means having a central longitudinal axis extending and defining a path therethrough and comprising in combination:

(a) a first annular member having a first seal accommodating face thereon said face being inclined so as to face toward said central longitudinal axis;

(b) an "O" ring or the like seal, abutting said face;

(c) a second annular member having a second seal accommodating face thereon for abutting said seal, said second seal accommodating face being inclined toward said central longitudinal axis; and

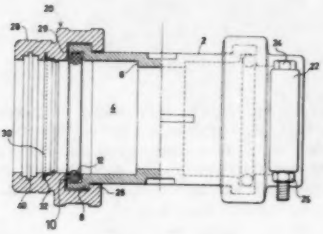
(d) clamping means having an overcenter type clamping action for clamping said first and second annular member together to thereby compress said seal between said seal accommodating faces and in view of their inclinations, displace said seal in a direction radially inwardly of said annular members toward said central longitudinal axis,

said clamping means having a handle with a pair of terminal ends, said terminal ends having a bearing face directly engaging said second annular member for use in providing said clamping action.

4,421,347
PIPE COUPLING

Itzhak Kantor, Menashe, Israel, assignor to Plasson Maagan Michael Industries Ltd., Menashe, Israel

Filed Nov. 20, 1981, Ser. No. 323,532
Claims priority, application Israel, Nov. 27, 1980, 61576
Int. Cl.³ F16L *17/00, 25/00, 21/00*
U.S. Cl. 285—369 **9 Claims**

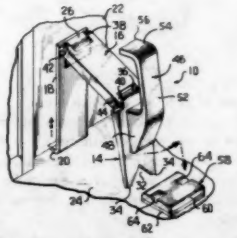


1. A pipe coupling including a housing having a bore for receiving the end of a pipe, and clamping means for clamping the pipe to the housing, characterized in that said clamping means is formed on its inner face with a first circumferentially-extending recess of substantially inverted-L-section to receive a first clamping ring of corresponding section, and with a second circumferentially-extending recess axially spaced from said first recess and of substantially T-section to receive a second clamping ring of corresponding section and of a lower hardness than the first clamping ring, to thereby enable the coupling to be used for coupling pipes of different hardnesses by selecting the appropriate clamping ring and inserting it into its respective recess.

4,421,348
DOOR GUARD

Robert S. Kahn, 220 San Vicente Blvd., Santa Monica, Calif. 90402

Continuation of Ser. No. 44,717, Jun. 1, 1979, abandoned. This application Nov. 20, 1981, Ser. No. 323,301
Int. Cl.³ E05C *19/18*
U.S. Cl. 292—339 **1 Claim**

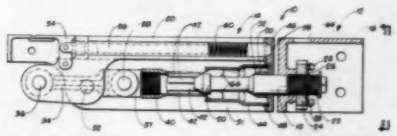


1. A door guard for holding a swinging door in a closed position; said door guard comprising three members including a door engaging member, a floor anchoring member and a locking member, first pivot means connecting said locking member to said door engaging member in angular relation and second pivot means pivotally connecting said floor anchoring member to said locking member in end to end relation, and cooperating means on said floor anchoring member and locking member for limited pivoting thereof to a straight line aligned coplanar relationship wherein said floor anchoring member and said locking member form a rigid arrangement, said cooperating means being in the form of a generally U-shaped handle having one end fixedly anchored to a selected one of said floor anchoring member and said locking member and a second end forming a stop for engaging an intermediate portion the other of said floor engaging member and said locking member when said floor engaging member and said locking member are in said straight line aligned coplanar relationship, said floor engaging member having a generally wedge shaped free end, said wedge shaped free end being bifurcated to define two spaced apart prongs, and an anchoring pad having a friction base for frictionally engaging the floor, and said anchoring pad having separate seats for separately receiving said prongs.

4,421,349
COWLING LATCH

Alfred H. Greiert, Jr., Valley Center, Kans., assignor to The Boeing Company, Seattle, Wash.

Filed Dec. 28, 1981, Ser. No. 335,224
Int. Cl.³ E05C *9/00, 19/06, 19/14*
U.S. Cl. 292—19 **5 Claims**



3. A cowling latch for an engine nacelle or the like, the latch comprising:

a keeper assembly having a pin extending outwardly therefrom, the pin having a pin head at one end thereof;

a latch assembly having a latch handle pivotally mounted thereon, the latch assembly having a collet expander end plated mounted on one end of the assembly and adjacent the keeper assembly when the assemblies are disposed adjacent each other, the end plate having an aperture for receiving a portion of the pin and the pin head therethrough, the end plate having a circular cam surface around the aperture; and

a collet assembly mounted in the latch assembly and including a collet linked to the latch handle, the collet having collet fingers extending outwardly therefrom and received in a circular hollow collet guide, a portion of the pin and the pin head received inside the collet guide when the ends of the collet fingers are secured around the pin head and the latch handle is in a closed position, the ends of the collet fingers engaging the cam surface of the end plate when the latch handle is in an opened position and the cam surface expanding the fingers outwardly for releasing the pin head received in the collet guide.

4,421,350
FOOT-OPERATED, LATCH RELEASING MECHANISM FOR AUTOMOBILE DOORS

Yasuo Gotomyo, Hiroshima, Japan, assignor to Toyo Kogyo Co., Ltd., Hiroshima, Japan

Filed Jun. 16, 1980, Ser. No. 159,924
Claims priority, application Japan, Jun. 18, 1979, 54-77196; Jun. 18, 1979, 54-83816[U]
Int. Cl.³ E05C *3/30*
U.S. Cl. 292—123 **11 Claims**

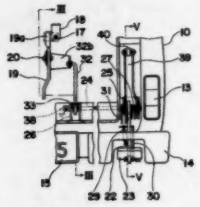
1. A foot-operated, latch releasing mechanism for a door assembly having at least one door supported for movement between opened and closed positions, a releaseable door latch assembly for latching the door in the closed position when and

after the door has been moved thereto, said door latch assembly including a claw member operatively supported for movement between latched and unlatched positions, and a striker engageable with the claw member when the door is moved to the closed position to latch the door in the closed position in cooperation with the claw member in the latched position, said foot-operated, latch releasing mechanism comprising, in combination:

a generally elongated foot-operated member supported for pivotal movement between inoperative and operated positions and having one end adapted to receive a treadling force necessary to move said foot-operated member from the inoperative position towards the operated position;

a return biasing means for urging the foot-operated member towards the inoperative position;

a latch release lever supported by the door for movement between first and second operative positions and operable to move the claw member from the latched position towards the unlatched position when said latch release lever is pivoted from the first operative position towards



the second operative position, said latch release lever being normally biased to the first operative position, an operating rod having one end pivotally connected to the latch release lever and the other end protruding to the outside of the door, a substantially intermediate portion of said operating rod being axially movably supported by the door, an actuating means supported for rotation in first and second directions opposite to each other, said actuating means being operable to move the operating rod in a direction required to cause the latch release lever to move from the first operative position towards the second operative position as said actuating means is rotated in the first direction, and a motion transmitting means for causing the actuating means to rotate in the first direction in response to the movement of the foot-operated member from the inoperative position towards the operated position; and

a forced door opener including an opener lever supported for pivotal movement between retracted and kicked positions, said opener lever being pivoted from the retracted position towards the kicked position in response to the release of the door latch assembly for forcibly opening the door.

4,421,351

ARRANGEMENT FOR LIMITING BUMPER MOVEMENT

Ulrich Bruhnke, Ehningen; Roman Schöppel, Sindelfingen, and Bernd Harloff, Böblingen, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

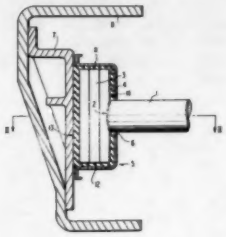
Filed Oct. 21, 1981, Ser. No. 313,505

Claims priority, application Fed. Rep. of Germany, Oct. 21, 1980, 3039674

Int. Cl.³ B60R *19/04, 19/06*

U.S. Cl. 293—132 **11 Claims**

1. A bumper arrangement for supporting a bumper on a motor vehicle, the arrangement including an impact body, an elastic bearing means surrounding the impact body, and further means for enabling a mounting of the impact body and bearing means on the motor vehicle, characterized in that the impact body includes a first contact area facing the bumper, a second contact area facing the further means, the first and second contact areas are disposed opposite to one another and are formed as convex surfaces, the bearing means includes a



top side, a bottom side, a front side facing the bumper, and a back side facing the further means, and in that portions of the top side, bottom side, front side, and back side, have a predetermined minimum thickness so as to enable the bumper to only carry out rotatable movements about an axis extending vertically relative to the motor vehicle.

4,421,352

LOOP AS WELL AS SLING FORMED THEREOF OR LOOP MAT FORMED THEREOF

Karl M. Raue, Falsterbo, Sweden, and Hans-Otto von Danwitz, Karst, Fed. Rep. of Germany, assignors to Spanset Inter AG, Basel, Switzerland

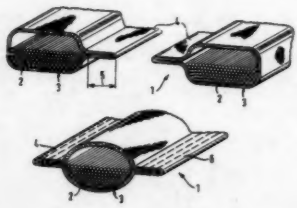
PCT No. PCT/EP81/00005, § 371 Date Sep. 9, 1981, § 102(e) Date Sep. 9, 1981, PCT Pub. No. WO81/02151, PCT Pub. Date Aug. 6, 1981

PCT Filed Jan. 21, 1981, Ser. No. 302,474

Claims priority, application Sweden, Jan. 21, 1980, 8000451; Fed. Rep. of Germany, Oct. 30, 1980, 8028911[U]

Int. Cl.³ B66C *1/12*

U.S. Cl. 294—74 **19 Claims**



1. A sling comprising:

a core formed of at least one yarn skein;

a seamless, woven protective sheath having internal and external surfaces, said sheath being in the form of an endless tube which entirely encloses said core, the threads of said skein being arranged in said tube to be movable relative to one another and the internal surface of said sheath; and

at least one flat rib woven to said sheath along its entire length and projecting outwardly from the external surface thereof;

wherein said sheath and rib woven thereto together have first and second section juxtaposed with respect to each other to form an intermediate region of the sling having opposite ends, with the portion of the rib associated with said first section overlapping and connected to a portion

of the rib associated with said second section; and said sheath and rib woven thereto together have third and fourth sections each connected to a respective one of said ends and forming respective hanging eyes.

16. A mat comprising:

a plurality of cores each formed of at least one yarn skein;

a plurality of seamless, woven protective sheaths each having internal and external surfaces, each said sheath being in the form of an endless tube which entirely encloses a respective one of said cores, the threads of each said skein being arranged in a respective one of said tubes to be movable relative to one another and the internal surface of the respective sheath;

a plurality of flat ribs woven to a respective one of said sheaths along its entire length and projecting outwardly from the external surface thereof;

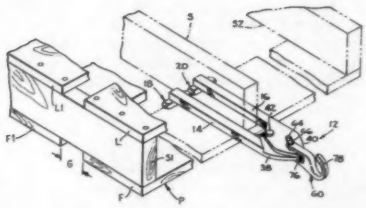
wherein a section of each said sheath and rib woven thereto is arranged to be in juxtaposition with a section of another said sheath and rib woven thereto so that the respective ribs of such juxtaposed sections overlap each other and are connected together.

4,421,353

PALLET PULLER

James P. Smith, Jr., 630 Masonic Way, Apt. B, Belmont, Calif. 94002

Filed May 12, 1980, Ser. No. 149,231
Int. Cl.³ B66C *1/48*
U.S. Cl. 294—82 R **11 Claims**



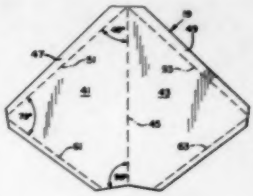
1. A pallet puller for engaging a pallet of the type that includes a plurality of foot boards having a given thickness and an upper surface, a plurality of stringers extending transversely of said foot board and secured thereto, said stringers each having a lower surface that abuts the upper surfaces of said foot boards on a plane, and a plurality of load supporting boards mounted on the upper side of said stringers opposite said foot boards, said stringers having a thickness so as to define a space between said foot boards and said load supporting boards that corresponds to said thickness of said stringers, one of said foot boards being an edge foot board and having an outer edge surface coextensive with a peripheral edge of the pallet and an inner edge surface interior of said outer edge surface and spaced apart from the next adjacent foot board by a gap, said pallet puller comprising an elongate rigid arm sized to fit into said space and having an inner end and an outer end, said elongate rigid arm having a support surface adapted to reside upon the upper surface of said edge board, a cross piece secured to said support surface adjacent said inner end and having a gripping projection protruding downward from said support surface and laterally outward of said arm so that said projection resides on or below said support surface, said gripping projection having a thickness less than said given thickness of said foot board so that said gripping projection can be disposed within said gap beneath said plane and said stringer in engagement with the inner edge surface of said foot board, and means on the outer end of said arm for effecting engagement with said arm.

4,421,354

AIR FOIL CONSTRUCTION

Glenn A. Lemaster, Vancouver, Wash., assignor to Sepco Enterprises, Inc., Portland, Oreg.

Filed Jan. 7, 1982, Ser. No. 337,741
Int. Cl.³ B62D *35/00*
U.S. Cl. 296—1 S **6 Claims**



1. An air foil for the cab of a highway tractor having a box-like trailer:

a foil structure having a pair of panels disposed at a substantial acute angle relative to one another to provide a substantially straight edge for cleaving into the air traveled by the vehicle,

means for mounting the air foil structure on the roof of the tractor cab with the edge facing forwardly but at an acute angle to the horizontal and to the vertical,

the rear edges of said panels lying in a vertical plane,

said air foil structure having an opening formed in its nose portion to facilitate entry of air into said air foil structure,

the rear margins of said panels terminating in outwardly flaring flanges for deflecting air laterally,

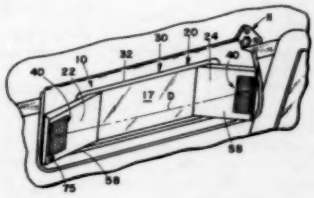
said flanges tapering in width so as to decrease in size from the upper portions thereof to the lower portions, so that air deflection increases as the displacement of the flange from the sides of the trailer increases.

4,421,355

ILLUMINATED VISOR ASSEMBLY

Konrad H. Marcus, Holland, Mich., assignor to Prince Corporation, Holland, Mich.

Filed Jul. 23, 1981, Ser. No. 286,339
Int. Cl.³ B60J *3/02*
U.S. Cl. 296—97 H **9 Claims**



1. A visor assembly for a vehicle comprising:

a generally rectangular visor body having a length in a longitudinal direction greater than its width in a transverse direction;

means for mounting said visor body to a vehicle for movement between a stored position and an operative sun screening position;

a mirror mounted to said visor body for use by a vehicle occupant;

and

door means pivotally mounted with respect to said visor body for movement about an axis generally orthogonal to said longitudinal direction and between a closed position covering said mirror and an open position uncovering said

mirror, and wherein said door means includes light means for directing illumination away from said visor when said door means is in said open position.

4,421,356

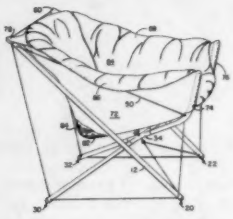
SUPPORT STRUCTURE FOR A PIECE OF FURNITURE

Mark Singer, 1663 Cambridge St., Cambridge, Mass. 02138

Continuation-in-part of Ser. No. 236,756, Feb. 23, 1981, abandoned. This application Dec. 21, 1981, Ser. No. 332,371

Int. Cl.³ A47C *4/02*

U.S. Cl. 297—16 **10 Claims**



1. A substantially rigid support structure, comprising

a pair of transversely spaced generally parallel rigid columnar struts, the axes of said struts being inclined with respect to the horizontal,

an integral generally X-shaped rigid member, oppositely inclined with respect to the horizontal and positioned intermediate and spaced from said struts,

a flexible tension member connecting each lower end of each strut with one lower end of the X-shaped rigid member at the side adjacent said strut,

a flexible tension member connecting each lower end of each strut with one upper end of the X-shaped rigid member at the side adjacent said strut,

a flexible tension member connecting each upper end of each strut with one lower end of the X-shaped rigid member at the side adjacent said strut,

a flexible tension member connecting each upper end of each strut with one upper end of the X-shaped rigid member at the side adjacent said strut,

and means for maintaining the upper end of said struts spaced apart from each other.

4,421,357

SADDLE SUPPORT DEVICE FOR A BICYCLE

Keizo Shimano, Sakai, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Filed Apr. 21, 1981, Ser. No. 256,238

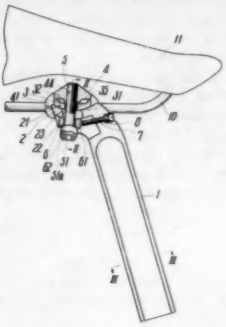
Int. Cl.³ B62J *1/00*

U.S. Cl. 297—195 **7 Claims**

1. A saddle support device for supporting a saddle having a saddle frame to the upper portion of a seat post of a bicycle, said seat post having a streamlined, non-round, cross-sectional shape, said saddle support device comprising:

(a) a support member fixed to the upper portion of said seat post, said support member having an upper surface, a lower surface, and a through bore penetrating said upper and lower surface, said upper surface having a spherical profile around said through bore;

(b) a clamping mechanism supported to the upper surface of said support member for clamping said saddle frame in position, said clamping mechanism comprising a receiving member, a holding member, a washer and a locking member comprising a headed bolt which has a lengthwise axis and which presses said holding member against said receiving member and fixes said receiving member to said support member, said receiving member having a lower surface seated on the upper surface of said support member and an upper surface opposite to said holding member and being formed to permit said locking member to penetrate through the central portion of said receiving member, said receiving member and holding member receiving between them a portion of said saddle frame, said lower surface of said receiving member having a spherical profile to mate with the spherical surface of said support member, so that said saddle having its frame clamped by said clamping mechanism is rotatable around the lengthwise axis of said locking member and is adjustable in its



vertical angle both longitudinally and laterally of a frame of said bicycle, said washer being interposed between the head of said bolt and the lower surface of said support member, said washer having an upper surface opposite to the lower surface of said support member and a lower surface opposite to said bolt head, said seat post having at an upper portion thereof a holding mechanism for engaging with said washer to maintain said clamping mechanism in its adjusted position with respect to said support member.

4,421,358

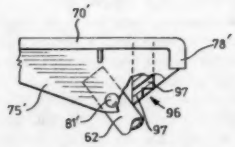
ARM REST CONSTRUCTION

James A. Lehnen, 84 Roosevelt Ave., Waterloo, Ontario, Canada

Continuation-in-part of Ser. No. 35,513, May 3, 1979, Pat. No. 4,252,371. This application Sep. 29, 1980, Ser. No. 191,525

Int. Cl.³ A47C *504, 7/12, 7/54*

U.S. Cl. 297—421 **5 Claims**



1. In a lounge chair construction having a seat portion and a back portion hinged together along a common edge, each said portion having sides substantially normal to said common edge, an arm rest member pivoted at its rearward end to a side edge of the back portion and pivoted near its forward end to a support member which in turn is pivoted to the corresponding side edge of the seat portion; the arm rest member, the support member and parts of the said side edges of the seat and back portions defining an approximate parallelogram:

the provision of a forward overhang on the arm rest member whereby the forward extremity projects forwardly from the location at which the arm rest member is pivoted to the support member, said location being under a top surface of the arm rest member, the support member terminating under said top surface, and a protective wall forming part of the arm rest member and positioned forwardly

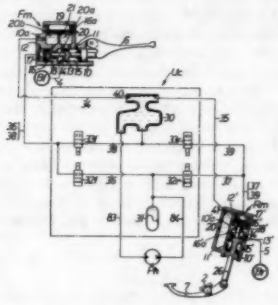
of said location below said top surface; such that, as the arm rest member moves rearwardly with the back portion, thus causing the angle which it defines with the support member to become larger, the said protective wall can come into contact with the support member below the said location whereby to prevent the arm rest member and support member from reaching a position in which the user's fingers become trapped between the support member and the forward part of the arm rest member.

4,421,359

VEHICULAR ANTI-LOCK BRAKE DEVICE

Tsutomu Hayashi, Hoya; Masaie Kato, Musashino, and Mitsuru Saito, Koganei, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 29, 1981, Ser. No. 268,133
Claims priority, application Japan, Jun. 13, 1980, 55-79727
Int. Cl.³ B60T *8/26*
U.S. Cl. 303—6 A **16 Claims**



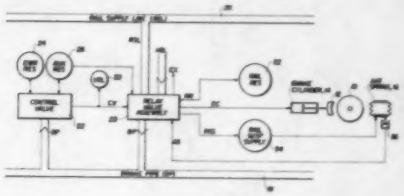
1. A vehicular anti-lock brake device comprising a first master cylinder including a cylinder body having a pair of serially aligned first and second cylinder bores divided by a partition; an operating piston slidable in said first cylinder bore and defining therein a brake chamber for applying brake oil pressure to said operating piston to produce a brake torque for a front wheel of the vehicle; a control piston slidable in said second cylinder bore and defining therein a control chamber for applying control oil pressure to said control piston; a piston rod extending through said partition between said first and second cylinder bores and operably connecting said control piston to said brake piston for applying a retracting force to said brake piston to reduce the brake torque when operating oil is introduced into said control chamber to prevent locking of the front wheel; and an oil tank having an interior partition of given height dividing the tank into a first oil reservoir for feeding operating oil to said brake chamber and a second oil reservoir; a second master cylinder including a cylinder body, an operating piston, a control piston and an oil tank, said operating piston of said second master cylinder defining a second brake chamber for applying brake oil pressure to the operating piston of said second motor cylinder to produce brake torque for a rear wheel of the vehicle, said control piston of the second master cylinder defining a control chamber in said cylinder body of the second master cylinder for applying control oil pressure to said control piston to prevent locking of the rear wheel, said brake chambers of the first and second master cylinders being hydraulically disconnected from one another to form independent brake systems for the front and rear wheels, an auxiliary oil tank connected to the oil tanks of the first and second master cylinders, a hydraulic pump having an inlet and an outlet, said auxiliary oil tank being connected to the inlet of said hydraulic pump; first and second normally open control valves and first and second normally closed control valves, said outlet of said hydraulic pump being connected through said normally closed first and second control valves respectively to said control chambers of said first and second master cylinders, said auxiliary oil tank being connected through said normally closed first and second control valves respectively to said control chambers of said first and second master cylinders.

4,421,360

RELAY VALVE ASSEMBLY

Ronald O. Newton, Adams, N.Y., assignor to General Signal Corporation, Stamford, Conn.

Filed Jan. 14, 1981, Ser. No. 224,932
Int. Cl.³ B60T *8/18*
U.S. Cl. 303—22 A **4 Claims**



1. A variable load relay valve for use in a fluid brake control system having a first fluid supply, a second fluid supply, control valve means responsive to a brake command to provide a fluid control signal from said first fluid source and means for providing a sensed load signal comprising:

a control port for receiving a fluid control signal;

an exhaust port connected to the atmosphere;

a brake cylinder port for providing fluid to a brake cylinder;

a first fluid supply port for receiving fluid from a first fluid supply;

a second fluid supply port for receiving fluid from a second fluid supply;

a piston valve means for interconnecting said brake cylinder port with said exhaust port and said second fluid supply port to determine the degree of braking;

first piston means movable in response to a fluid control signal at said control port;

load means interconnecting said piston valve means and said first piston means for varying the effect that said fluid control signal on said first piston means produce on said piston valve means as a function of a sensed load signal; and

second piston means movable in response to pressure on said first fluid supply port for controlling the operation of said piston valve independent of said load means to apply pressure from said second fluid supply port to said brake cylinder port when the pressure on said first fluid supply port is less than a predetermined value.

4,421,361

BRAKE FLUID PRESSURE CONTROL APPARATUS IN SKID CONTROL SYSTEM

Tetsuro Arikawa, and Hideyuki Yamada, both of Yokosuka, Japan, assignors to Nippon Air Brake Co., Ltd., Kobe, Japan

Filed Dec. 8, 1981, Ser. No. 328,697
Claims priority, application Japan, Dec. 10, 1980, 55-173956; Dec. 15, 1980, 55-176775
Int. Cl.³ B60T *17/18, 8/02*
U.S. Cl. 303—92 **20 Claims**

1. A brake fluid pressure control apparatus in a skid control system for a vehicle having at least one wheel and a brake for the wheel comprising:

(A) a control unit for measuring the skid condition of the wheel;

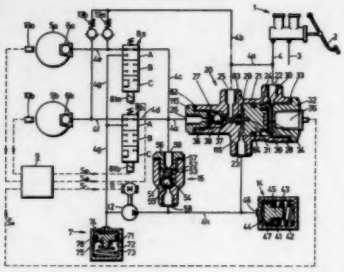
(B) a fluid pressure control valve device arranged between a master cylinder and a wheel cylinder of a brake for the

wheel, said fluid pressure control valve device receiving control signals of said control unit to control the brake fluid pressure to said wheel cylinder;

(C) a hydraulic reservoir which, when the brake fluid pressure to said wheel cylinder is decreased with control of said fluid pressure control valve device, reserves the brake fluid discharged through said fluid pressure control valve device from said wheel cylinder;

(D) a pressure fluid supply conduit connecting said master cylinder with said fluid pressure control valve device;

(E) a fluid pump with motor receiving a pump drive signal of



said control unit for returning the brake fluid from said hydraulic reservoir into said pressure fluid supply conduit;

(F) switching means for detecting operation of said fluid pump with motor, and generating an operation detecting signal when said fluid pump with motor effectively operates; and

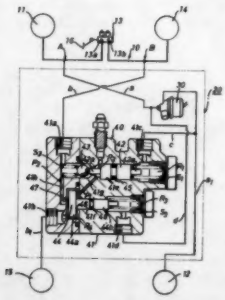
(G) pump fail detecting means receiving said pump drive signal of the control unit and the output of said switching means, said pump fail detecting means generating a pump fail detecting signal when said switching means, after and when receiving said pump drive signal, does not generate said operation detecting signal.

4,421,362

ANTI-SKID BRAKE CONTROL SYSTEM FOR WHEELED VEHICLES

Kenji Shirai, and Fumio Nakagawa, both of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Oct. 29, 1981, Ser. No. 316,276
Claims priority, application Japan, Nov. 10, 1980, 55-158459
Int. Cl.³ B60T 8/02
U.S. Cl. 303—115 **5 Claims**



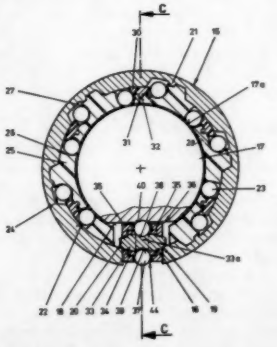
1. An anti-skid brake control system for a wheeled vehicle having dual hydraulic braking circuits connecting a tandem master cylinder to the left and right rear-wheel brake cylinders, and an electronic anti-skid brake control apparatus incorporated with one of said hydraulic braking circuits for decreasing the pressure applied to one of said rear-wheel brake cylinders from said master cylinder in response to an electric signal indicative of a predetermined wheel locking condition, the anti-skid brake control system comprising a modulator valve assembly incorporated with the other hydraulic braking circuit to cooperate with said anti-skid brake control apparatus, said modulator valve assembly including a housing provided with inlet and outlet ports respectively in connection to said master cylinder and the other rear-wheel brake cylinder through the other hydraulic braking circuit, a balance piston axially movable within said housing and being exposed at its opposite ends to the pressure respectively applied to said rear-wheel brake cylinders to be moved in an axial direction by the difference in pressure between said rear-wheel brake cylinders, a check valve arranged within said housing to cooperate with said balance piston, said check valve being opened under inoperative condition of said balance piston to permit the flow of pressurized fluid between said inlet and outlet ports and being closed upon movement of said balance piston in the axial direction to interrupt the fluid communication between said inlet and outlet ports, a communication passage formed between said check valve and said outlet port, a bypass passage for providing a direct fluid communication between said inlet and outlet ports, and a change-over valve disposed within said communication passage and being responsive to the respective pressures of said hydraulic braking circuits to permit the flow of pressurized fluid through said communication passage and close said bypass passage under normal condition of said hydraulic braking circuits and to close said communication passage and open said bypass passage in response to braking operation under damage of the one of said hydraulic braking circuits.

4,421,363

ROLLING BEARING FOR LENGTHWISE MOVEMENT HAVING RESILIENT GUIDE ELEMENT

Armin Olschewski, Schweinfurt; Manfred Brandenstein, Eussenheim, and Lothar Walter, Schweinfurt, all of Fed. Rep. of Germany, assignors to SKF Kugellagerfabriken GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Mar. 19, 1981, Ser. No. 245,518
Claims priority, application Fed. Rep. of Germany, Mar. 28, 1980, 3012018
Int. Cl.³ F16C 29/06
U.S. Cl. 308—6 C **11 Claims**



1. In a rolling bearing for lengthwise movement between a slide element and a rail element, including at least one cage between the slide element and rail element and at least one endless row of rolling bodies positioned in the cage, the slide element and rail element having opposed lengthwise directed races between which the loaded rolling bodies of the row roll, the cage having a longitudinal first guide for loaded rolling

bodies, a longitudinal second guide for unloaded rolling bodies, and a pair of turn-around guides joining the ends of the first and the second guides of the respective rows; the improvement wherein an elastic guide means is provided adjacent at least one side of at least one of said first and second guides and positioned to resiliently urge rolling elements in said one guide toward one of said races, said guide means being a plastic material filled with lubricating oil and being adapted to release lubricant.

4,421,364

AUTOMATON FOR DEALING OUT FOOD AND DRINK

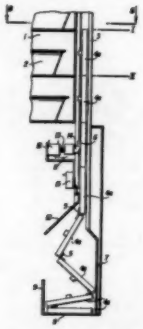
Tauno K. Takaniemi, Näsilinnankatu 30 B 31, SF-33200 Tampere 20, Finland

Continuation of Ser. No. 50,846, Jun. 20, 1979. This application Oct. 16, 1981, Ser. No. 312,048

The portion of the term of this patent subsequent to Oct. 27, 1998, has been disclaimed.

Int. Cl.³ A47F *3/02*; B65D *83/08*

U.S. Cl. 312—35 **9 Claims**



1. An apparatus for dispensing products, comprising:

a plurality of product receiving shelf spaces arranged one above the other;

door means, including a plurality of interconnected panels for closing said product receiving shelf spaces, said door means being arranged for movement due to the effects of gravity, downward past said shelf spaces; and

means for (1) selectively releasing said door means for downward movement from an initial, upper position, to open and to permit removal of a product from a first one of said shelf spaces which was closed by said door means in said initial upper position and (2) for subsequently arresting said door means from further downward movement beyond said first one of said shelf spaces, to prevent removal of another product from a second, still lower one of said shelf spaces which also was closed by said door means in said initial position.

4,421,365

MOVABLE STORAGE CABINET

Genshi Taniwaki, Kumamoto, Japan, assignor to Kongo Co., Ltd, Japan

Continuation of Ser. No. 166,111, Jul. 3, 1980, abandoned, which is a continuation of Ser. No. 925,750, Jul. 18, 1978, abandoned. This application Feb. 16, 1982, Ser. No. 349,160

Claims priority, application Japan, Oct. 3, 1977, 52-132898

Int. Cl.³ A47B *53/02*

U.S. Cl. 312—198 **1 Claim**

1. A movable storage cabinet supported on wheels for movement along rails installed on a floor and having a cabinet depth and an incremental cabinet length at least one incremental cabinet length making up an entire frontage length of the cabinet and the cabinet expandable in frontage length by said incremental cabinet length, said cabinet comprising:

a plurality of inverted U-shaped channels (**8**) forming saddles extending, in spaced relationship to each other, parallel to the depth of the cabinet, the flanges of said channels having aligned apertures (**15, 13**) for receiving wheel bearing shafts adjacent each end of said saddles with the number of said saddles equal to one more than the number of incremental cabinet lengths making up the entire frontage length of the cabinet;

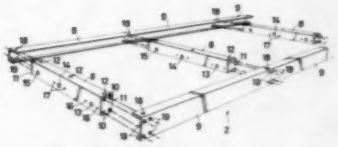
wheel shafts (**22, 26**) engaged through said apertures;

wheels (**24, 27**) mounted on said shafts and in each of said channels to engage said rails and support said channels;

a fixture plate (**11**) connected to each end of said saddles with at least two openings (**10**) therein;

pairs of C-shaped connection members (**9**) with upper and lower flanges embraced around and secured to opposite ends of adjacent saddles and interconnecting adjacent pairs of said saddles having a length to extend across the space between adjacent saddles and substantially equal to said incremental cabinet length;

said connection members (**9**) each having at least one opening (**19**) aligned with one of said fixture plate openings (**10**) respectively, said connection members secured to said saddles by bolts extending through said aligned openings and a number of said pairs of connecting members chosen to form a desired entire frontage length of the cabinet, each saddle at each cabinet end in the frontage length direction having an outer channel flange thereof covered by an end of said connecting members at opposite ends of the cabinet;



each saddle other than said end saddle, connected to two pairs of connecting members each;

said saddles and an upper flange of each of said connection members formed with holes (**12, 18**) at the top thereof;

stanchions (**3**) extending through said top holes;

shelves (**5**) supported on said stanchions;

side plates (**7**) secured to the opposite ends of said cabinet;

a handle shaft rotatably mounted through one side plate of said cabinet;

a rotatable handle (**33**) secured to said shaft;

a bearing (**21**) connected between at least one wheel shaft (**22**) of each saddles at one common side of each saddle with said one wheel shaft extending beyond said bearing on both sides thereof; and

a reduction gearing interconnecting said handle shaft and said one wheel shaft (**22**) at said one common side of each saddle;

said reduction gearing comprising an intermediate shaft (**29**) rotatably mounted through the one of said saddles adjacent said one side plate carrying said handle shaft and between said wheels mounted on said wheel bearing shaft (**22, 26**) of said one of said saddles, a pulley (**31**) on said intermediate shaft, a pulley (**25**) on one of said one wheel bearing shafts (**22**) of said one saddle, and a belt (**32**) connecting said pulleys for rotation, each of said one wheel shafts (**22**) of said one common side of each of said saddles connected to each other through pipes (**23**);

whereby the cabinet can be increased in frontage length by connecting an additional pair of connection members (**9**), an additional saddle (**8**) and an additional pipe (**23**) at one end of the cabinet;

pairs of said connection members at opposite ends of the

cabinet having a length greater than pairs of said members intermediate the cabinet ends by one half the width of said saddles;

each fixture plate (11) of each saddle including at least two pairs of openings (10), each connection member (9) having at least one pair of openings (19) at each end thereof, each saddle other than said end saddles having each pair of openings thereof connected to one pair of openings from two adjacent pairs of connection members.

4,421,366

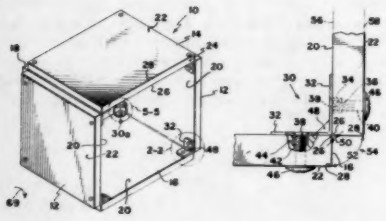
SELF-ASSEMBLY FURNITURE

Chester Niziol, 91 Yonge St., Suite 401, Toronto, Ontario, Canada M5C 1S8

Filed Jul. 28, 1980, Ser. No. 173,115

Int. Cl.³ A47B *43/00, 48/00*

U.S. Cl. 312—257 A **16 Claims**



1. An article of furniture which can be assembled and disassembled, comprising:

a plurality of generally planar, angularly related panels, each having

first and second generally parallel side faces; and

a first plurality of bolt-receiving bores adjacent the edge portions of said panels extending from said first side face to said second side face;

corner connector means which detachably couples said panels together in a predetermined angular relationship but with adjacent border edge portions of adjacent panels being in spaced-apart relation that provides gaps between adjacent edges of adjacent panels, each comprising:

a plurality of individual bracket members independent of each other bracket member, each bracket member including angularly related integral flange members, each having an inner surface and an outer surface abutting one of said panel side faces;

each of said flange members including an annular projection extending outwardly from said outer surface of said flange member and received by said bolt-receiving bores in said panels;

each of said projections having an internally threaded bolt-receiving bore therethrough; and

bolt means, received by said bolt-receiving bores in said panel and threadedly coupled to said bolt-receiving bores of said projections, which releasably clamps said flange members to said panels;

the length of said bracket members in a direction parallel to the panel edge portion to which it is coupled, being substantially less than the length of the panel edge portion to which it is coupled whereby unobstructed openings are provided between the adjacent border edge portions of adjacent panels substantially the length of said edge portions.

4,421,367

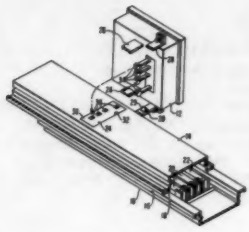
GROUNDING SPRING FOR BUS DUCT PLUG-IN UNITS

Bill M. Shannon, Rochester Township, Beaver County, and Charles L. Weimer, Patterson Heights, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 29, 1981, Ser. No. 287,842

Int. Cl.³ H01R *4/66*

U.S. Cl. 339—14 R **2 Claims**



2. A bus duct assembly, comprising:

a bus duct section having top and bottom walls and opposite side walls so as to form a housing;

a bus bar supported within said housing;

an opening on said bottom wall for providing external access to said bus bar;

a tap box detachably attached at said opening, and having a terminal there-within for connection to said bus bar; and

a pair of spaced apart grounding means connected to said tap box each for cooperating with the other by making compressive electrical contact with opposite side walls of said bus duct section before said terminal makes contact with said bus bar.

4,421,368

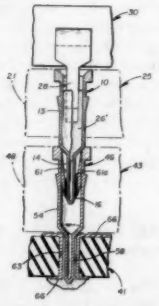
LEAD-RECEIVING SOCKET, MULTI-SOCKET ASSEMBLY INCORPORATING SAME AND METHOD OF EFFECTING CIRCUIT INTERCONNECTIONS THEREWITH

John F. Saban, Lyons, Ill., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Jul. 31, 1981, Ser. No. 289,019

Int. Cl.³ H01R *13/28*

U.S. Cl. 339—17 CF **6 Claims**



1. An interconnected composite circuit package comprising:

a multi-leaded circuit module having a plurality of leads extending therefrom;

a circuit board having a plurality of pre-formed holes therein and associated circuitry formed on one surface thereof;

at least one primary socket assembly including at least one predetermined array of primary sockets permanently

secured to said circuit board, each of said primary sockets having an upper female portion with internally confined precious metal contacts adapted to receive and releasably electrically engage an associated male-type pin, and further having a lower terminal portion adapted to be received within one of said plurality of preformed holes and soldered to said associated circuitry on said circuit board, and

at least one auxiliary multi-socket assembly interposed between said circuit module and said primary socket assembly, said auxiliary socket assembly including a non-conductive block, and a plurality of low profile circuit-module lead-receiving auxiliary sockets supported by, and extending through, said block in at least one predetermined spaced array corresponding to the array of sockets in said primary socket assembly, each of said auxiliary sockets comprising a conductive shell having an upper female portion of sufficient inside cross-section to receive both a pre-formed solder insert and one of said circuit module leads therewithin, and further having a lower male-type pin portion, with at least a selected area therealong being precious metal plated so as to be releasably received within, and to establish precious metal-to-precious metal contact with, said contacts confined within said female portion of an aligned one of said primary sockets, said pre-formed solder insert in each of said auxiliary sockets being adapted, upon subsequently being heated to a molten state and then allowed to re-solidify, after an aligned circuit module lead has been nested therein, to fill the interstices between the inner wall of the female portion of said associated socket shell and such a nested lead, along at least substantial, co-extensive axial lengths thereof.

4,421,369

PANEL MOUNTED CONNECTOR

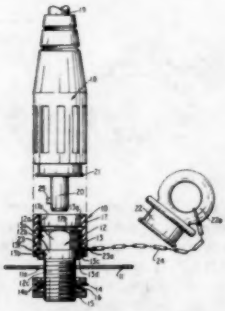
Reidar Myking, P.O. Box 45, N-5100 Isdalst, Norway

Filed Jul. 20, 1981, Ser. No. 285,062

Claims priority, application Norway, Jul. 25, 1980, 802246

Int. Cl.³ H01R *13/74*

U.S. Cl. 339—36 **10 Claims**



1. Contact-forming coupling means for cooperatively engaging coupling means connected to a current conductor cable for electrode welding and comprising a current conductor portion, first and second clamp members formed from an electrical insulating material and adapted to engage each other to support said current conductor portion on a fastening plate, said first clamp member being arranged to be fastened non-turnably to said current conductor portion and to form an abutment against one side of said fastening plate and said second clamp member being arranged to be secured via said current conductor portion in abutment with the opposite side of said fastening plate, said first clamp member having a fastening portion surrounding said current conductor portion while projecting endways outwardly from said fastening plate, a sleeve composed of elastically yielding material surrounding and permanently connected to said fastening portion, said sleeve having a portion which projects a distance endways outside said current conductor portion and radially spaced from the latter.

4,421,370

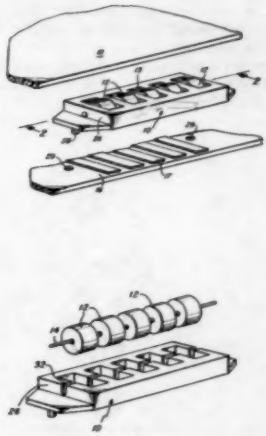
CONTACT ARRAY

Paul W. Treakle, Atkinson, and Edward W. Cielakie, Londonderry, both of N.H., assignors to Accutest Corporation, Chelmsford, Mass.

Filed Jul. 16, 1981, Ser. No. 283,956

Int. Cl.³ H01R *9/09*

U.S. Cl. 339—59 M **17 Claims**



1. A contacting elastomeric array comprising;

an electrically insulating support means, comprising a plastic boat having a plurality of vertically extending through slots,

a plurality of electrically conductive elastomeric contacts,

said plastic boat slots for accommodating the elastomeric contacts in a spaced array,

and means supporting the elastomeric contacts in said through slots of the support means with each contact being supported with limited compressive movement relative to the support means, said contacts, each including a substantially cylindrical contact having an axial hole for receiving the means supporting the elastomeric contacts and orienting the contacts for receiving compressive forces against the arcuate sides thereof rather than at flat ends.

4,421,371

ELECTRICAL SELF-ALIGNING CONNECTOR

Keith H. Clark, Decatur, and Donald R. Scott, Athens, both of Ala., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Continuation of Ser. No. 168,995, Jul. 15, 1980, abandoned. This application Sep. 30, 1982, Ser. No. 432,057

Int. Cl.³ H01R *13/12, 13/62*

U.S. Cl. 339—64 M **2 Claims**

1. A self-aligning electrical connector device comprising:

a receptacle having a conically contoured interior tapered downwardly from an open end toward a remote end of said interior;

a plug having a correspondingly conically contoured body receivable in said contoured interior of said receptacle,

said plug body being tapered from one end to another in the same direction as said interior of said receptacle;

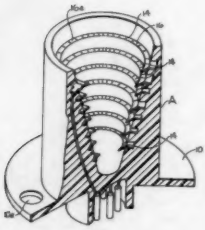
said plug including a plurality of spaced conductive ring elements adapted for electrical connection to an outside source, each said ring element of said plug having a mating conductive face around the circumference of said ring element;

said plug ring elements having progressively smaller diameters decreasing in the direction of taper of said plug body;

said receptacle including a plurality of correspondingly spaced conductive ring elements secured within said contoured interior of said receptacle component having progressively smaller diameters decreasing in the direction of taper of said contoured interior of said receptacle corresponding with the diameter of said receptacle ring elements;

each said receptacle ring element including a plurality of individual segmented portions around the circumference of said ring element;

said segmented portions of each ring element being separately deflectable downwardly in the direction of taper of said contoured interior of said receptacle;



said segmented portions of each said ring element being defined by slits so that adjacent segments of said ring are in edge-to-edge contact when said segments are in an undeflected position and form a continuously closed ring element when said ring is disengaged from said receptacle component;

said segmented portions of each said receptacle ring element having a deflected position wherein said segmented portions separate from one another and bend downwardly when said plug is inserted in said receptacle, said segmented ring element extending into said interior at such an angle that upon deflection a biasing force is asserted against said ring elements of said plug for positive electrical contact around the circumference of said ring elements; and

said segment portions in said deflected position exerting an axial ejection force against said plug body in a direction opposite to said direction of taper of said plug body to urge said plug body outwardly from said receptacle when said plug and receptacle components are released for disengagement facilitating disengagement without exterior force so that said receptacle and plug may separate with reduced damage to electrical connections.

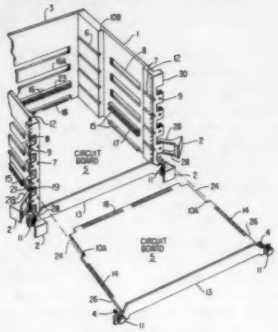
4,421,372

INSERTION-WITHDRAWAL MECHANISM FOR RACK MOUNTED CIRCUIT BOARDS

Raymond Golden, Willowick, Ohio, assignor to The Babcock & Wilcox Company, New Orleans, La.

Filed Jun. 13, 1979, Ser. No. 48,282
Int. Cl.³ H01R *13/54*
U.S. Cl. 339—75 MP **5 Claims**

1. In a mechanism for the insertion into or withdrawal from a support structure of a circuit board having an array of male contacts mounted along a lateral edge for engagement with a mating array of zero insertion force female contacts mounted in the support structure, a linear cam expanding said female contacts to receive said male contacts when moved to a first position and contracting said female contacts into engagement with said male contacts when moved to a second position, a detent in the support structure and a pawl operatively con-



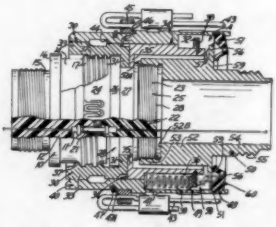
nected to said cam adapted to engage said detent when said cam is in said first position whereby movement of said cam from said first to said second position is inhibited when said pawl engages said detent.

4,421,373

ELECTRICAL CONNECTOR HAVING MEANS FOR SEALING AGAINST MOISTURE

Lloyd G. Ratchford, Oneonta, and Dee A. Werth, Afton, both of N.Y., assignors to The Bendix Corporation, Southfield, Mich.

Filed Dec. 28, 1981, Ser. No. 334,869
Int. Cl.³ H01R *13/52*
U.S. Cl. 339—94 M **5 Claims**



1. An electrical connector having means for sealing against moisture, the electrical connector of the type including a pair of electrical connector members (**10, 20**) having their forward end portions (**14, 24**) mated; a duality of electrical contacts (**11, 21**) carried by said connectors and forming an electrical interconnection in the mated connectors; means (**40, 30, 35, 37, 17**) for releasably coupling the connector members, the releasable coupling means being carried by one connector member for connection to the other connector member and including a sleeve (**40**) having an interior wall (**49**) circumposed about a spring retainer (**35**) and mounted for movement rearwardly of said forward end portions; and means (**39**) disposed in the retainer for resisting rearward movement of the sleeve and for normally biasing the sleeve forwardly, the means for sealing against moisture characterized by:

said sleeve (**40**) having an annular recess (**48**) circumposed around the interior wall (**49**);

a sealing adapter (**50**) mounted to said one connector member and including a radial collar (**56**) defining oppositely disposed first and second end faces (**57, 59**); and

a moisture seal (60) carried by the sleeve (40), said mositure seal comprising an outer ring portion (62) sized to fit the annular recess (48), an inner ring portion (66) adapted to contact and seal about the radial collar (56) and a resilient skirt (64) interconnecting said ring portions (62, 66), said skirt (64) including first and second skirt portions (70, 72) with said first skirt portion (70) extending from its connection to the outer ring portion (62) and said second skirt portion (72) extending from its connection to the inner ring portion (66).

4,421,374

TRIFURCATED INSULATION-PENETRATING TERMINAL

Lino M. Montilla, Jr., and Alexander Uchuck, both of Baltimore, Md., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Sep. 5, 1980, Ser. No. 184,565
Int. Cl.³ H01R *11/20*
U.S. Cl. 339—97 P **12 Claims**

1. A terminal for electrical conductors, said terminal being made from an electrically conductive material and capable of being mounted in an aperture of a supporting block that is made of a dielectric material with portions of said terminal extending beyond a surface of the block to which the aperture opens to permit the connection of conductors, said terminal comprising:

a generally planar base portion; and

a trifurcated portion which is connected to said base portion, said trifurcated portion being generally coplanar and unitary with said base portion and comprising;

a center furcation including a projecting key adapted to be received in a recess of an aperture of the supporting block in which said terminal is mounted; and

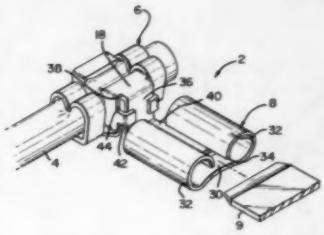
a lateral furcation which is disposed adjacent to each side of said center furcation with adjacent portions of each lateral furcation and said center furcation forming therebetween a conductor-receiving slot and an elongated associated opening that communicates with an inner end of the associated conductor-receiving slot and that extends substantially to said base portion, said projecting key of said center furcation being formed substantially along a line which is transverse of a longitudinal axis of said terminal and which extends through the intersections of said conductor-receiving slots and said elongated openings and being adapted to cooperate with a portion of the supporting block which defines said recess substantially to prevent movement of said center furcation toward one of the lateral furcations when a conductor is inserted into the slot which is defined by the center furcation and the other lateral furcation.

4,421,375

FLAG-TYPE TERMINAL HAVING INSULATION DISPLACEMENT WIRE CONNECTION

Daniel R. Coldren, Enola, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 29, 1982, Ser. No. 362,772
Int. Cl.³ H01R *4/24*
U.S. Cl. 339—97 R **7 Claims**



1. A flag-type terminal of the type having a wire connecting portion and a contact portion which extends laterally of the wire connecting portion, the terminal being characterized in that:

the wire connecting portion comprises a pair of spaced apart aligned plate-like members, each of the members having a first end and a second end, the first ends being connected by spaced apart connecting straps, aligned wire-receiving slots extending into the plate-like members from the first ends whereby a wire can be moved between the connecting straps, and into the wire-receiving slots,

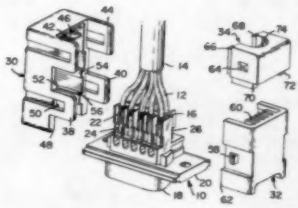
the contact portion being integral with, and extending laterally from, one of the connecting straps.

4,421,376

SNAP-ON CABLE CLAMP

Pete Cosmos, and Earl W. McCleerey, both of Mechanicsburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 9, 1981, Ser. No. 319,348
Int. Cl.³ H01R *13/58*
U.S. Cl. 339—103 M **7 Claims**



1. A snap-on cable clamp assembly providing 90° of 180° cable exiting from an electrical connector, said cable clamp assembly comprising:

first and second mating housing members of substantially rectangular configuration defining therebetween a connector receiving cavity, said housing members having like width and depth but substantially different lengths to define an enlarged cable exit opening from the assembled housing members in two directions normal to each other, each said housing member having a cable gripping profile directed towards said cable exit, and means to latchingly engage said housing members; and

a cable clamp having a width and depth equal to said housing members and length equal to the difference in length of said

housing members, said cable clamp having a cable gripping profile on a first side, and adjacent housing members engaging second and third sides, and means to latchingly engage said first and second housing members,

whereby with said second side engaging said first housing member and said third side engaging said second housing member 180° cable exiting is achieved while with said second side engaging said second housing member and said third side engaging said first housing member 90° cable exiting is achieved.

4,421,377

CONNECTOR FOR HF COAXIAL CABLE

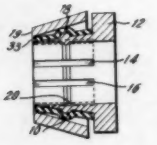
Georg Spinner, Am Eichberg 12, D-8155 Westerham, Fed. Rep. of Germany

Filed Sep. 23, 1981, Ser. No. 304,821

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1980, 3036215

Int. Cl.³ H01R *17/18*

U.S. Cl. 339—177 R **16 Claims**



1. A connector for a coaxial cable which includes an inner conductor, a dielectric layer around the inner conductor and an outer conductor supported by the dielectric layer, the connector comprising:

a bushing for making mechanical contact with the outer conductor;

the bushing having an inner surface and an outer surface, and at least one slot extending axially along the bushing and passing between the inner surface and the outer surface; the slot lying in a plane tangential to the inner surface of the bushing; the bushing being emplaceable over the outer conductor, and the slot therein being for receiving a cut leading edge of the outer conductor, and the bushing and slot being configured so that a portion of the outer conductor having the cut leading end thereof received in the slot passes through the slot upon relative rotation of the bushing and the coaxial cable.

4,421,378

ELECTRICAL CONTACT RETENTION INSERT AND MEANS FOR MOLDING SAME

Richard Sanford, Maryland, and Normand C. Bourdon, Unadilla, both of N.Y., assignors to The Bendix Corporation, Southfield, Mich.

Continuation of Ser. No. 92,132, Nov. 7, 1979, abandoned. This application May 3, 1982, Ser. No. 373,906

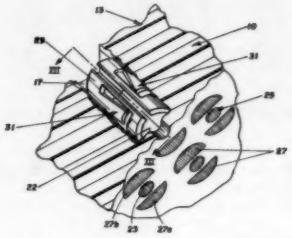
Int. Cl.³ H01R *13/434*

U.S. Cl. 339—217 R **10 Claims**

1. In an electrical connector insert for removably receiving an elongated electrical contact of the type having a retention section defining forward and rearward facing shoulders, said insert having an axial passage therethrough from a front face to a rear face to removably receive a resilient contact retention clip, said contact being removably secured within the passage by means of the resilient clip being received within said passage, said clip being longitudinally split to permit diametrical reduction and including resilient means to engage the rearward facing shoulder of the contact, the improvement wherein said insert comprises a dielectric body which has integrally formed therewith:

retention means disposed at opposite ends of said passage for retaining the retention clip within the insert, said retention means including a first vertical wall adjacent to said rear face for engaging one end of the clip and a second vertical wall adjacent to said front face for engaging the other end of the clip and the forward facing shoulder of said contact, said first vertical wall including at least two angularly spaced vertical wall portions;

constriction means extending radially inward into the passage for reducing the retention clip diameter, said constriction means including each said first vertical wall comprising a pair of flat surfaces which intersect with



each other to form a concave V-shaped constriction, the flat surfaces forming the V-shaped constriction being coaxial with the passage and adapted to engage and bear against the outer clip wall to reduce the diameter of the clip;

support means adjacent to said front face for supporting a forward mating section of the contact; and

means defining an opening in one of said vertical walls for receiving a release tool to diametrically reduce the clip diameter and thereby permit removal of the clip through the constriction, said opening being defined by said angularly spaced vertical wall portions.

4,421,379

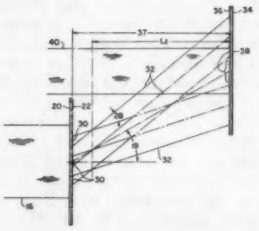
MULTIPLE HOLOGRAPHIC LENS

Alex Grumet, Whitestone, N.Y.; Abe Wolf, Sun City West, Ariz., and Gaspar J. Calderone, Lake Grove, N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Jan. 12, 1981, Ser. No. 224,279

Int. Cl.³ G02B *5/32*

U.S. Cl. 350—3.72 **11 Claims**



1. A method of fabricating a multiple holographic lens comprising the steps of:

fabricating an off-axis fly's eye lens with a plurality of non-overlapping lenslets, each such lenslet having a predetermined f-number and covering a non-negligible area on the lens;

inserting the fly's eye lens in a first beam of light from a coherent source to provide a plurality of refracted beams in one to one correspondence with the lenslets of the fly's eye lens;

positioning a holographic recording medium so that an area thereon is illuminated simultaneously by each of the refracted beams;

directing a second beam of light from the coherent source toward the area of the holographic recording medium illuminated by the refracted beams;

exposiing the holographic recording medium simultaneously to the second beam and the refracted beams;

developing the holographic recording medium to form the multiple holographic lens therefrom.

4,421,380

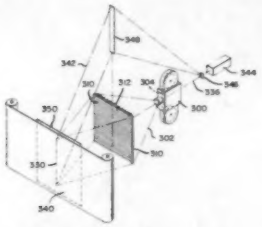
FULL-COLOR HOLOGRAM

Stephen P. McGrew, 1717 Columbus Pl., Santa Clara, Calif. 95051

Filed Oct. 6, 1980, Ser. No. 194,438

Int. Cl.³ G03H *1/30*

U.S. Cl. 350—3.78 **10 Claims**



1. A multicolor hologram comprising:

a first group of small areas of a recording medium, said group bearing diffractive patterns substantially corresponding to a spatially sampled, first hologram recorded in a first color and bearing an image having horizontal parallax, substantially no vertical parallax, and a finite degree of vertical diffuseness;

first color filter means proximate said first group of small areas to limit reconstruction of an image from said first group of areas to a predetermined first color;

a second group of small areas of said recording medium non-overlapping with said first group of small areas and distributed on said surface, said second group bearing diffractive patterns substantially corresponding to a spatially sampled, second hologram recorded in a color different from that of said first hologram and bearing an image with horizontal parallax, substantially no vertical parallax, and a finite degree of vertical diffuseness; and

second color filter means located proximate said second group of small areas to limit reconstruction of the image from said second group of areas to a predetermined second color.

4,421,381

MECHANICAL VIBRATING ELEMENT

Toshitsugu Ueda, and Fusao Kohsaka, both of Tokyo, Japan, assignors to Yokogawa Hokushin Electric Corp., Tokyo, Japan

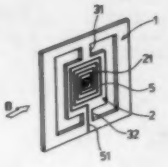
Filed Mar. 11, 1981, Ser. No. 242,627

Claims priority, application Japan, Apr. 4, 1980, 55-44383; May 22, 1980, 55-69112

Int. Cl.³ G02B *7/18*; G01R *13/38*

U.S. Cl. 350—6.6 **12 Claims**

1. A mechanical vibrating element characterized: in that a frame and a moving portion supported by said frame are constructed of a single insulating substrate; in that said moving portion is formed with one or more coils or conductive patterns; in that both the formations of said frame and said moving portions and the formations of said coils or said conductive patterns are made by photolithographic and etching techniques and in that a current is fed to said coils or conductors, while imparting a magnetic field in the same direction as the plane



direction of said insulating substrating, so that said moving portion may be mechanically vibrated.

4,421,382

FIBER RETAINING DEVICE FOR POWER LASER

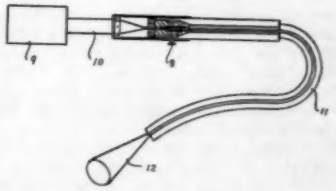
Yuzuru Doi, Niza; Teruyuki Kakeda, and Noriaki Kawamura, both of Tokyo, all of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 6, 1981, Ser. No. 241,440

Claims priority, application Japan, Apr. 1, 1980, 55-43223[U]

Int. Cl.³ G02B *7/26*

U.S. Cl. 350—96.20 **1 Claim**



1. A medical laser scalpel comprising:

a cylindrical lens mount guide sleeve,

a lens mounted proximate a first end of said sleeve,

a cylindrical tube received in a second end of said sleeve and slidably retained therein, said tube being formed with a through-hole having a frusto-conical section formed at an intermediate section thereof and having internal threads formed proximate one end thereof,

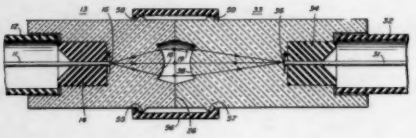
an integrally molded fiber retainer positioned within the through-hole of said cylindrical tube for holding and accurately centering a bundle of optic fibers, said fiber retainer including a cylindrical centering member having a central hole, a frusto-conical chucking member spaced from said centering member having a central hole aligned with the central hole in said centering member and a plurality of slits extending along the length thereof and inwardly from the surface thereof,

a holding ring coupled to said cylindrical member having external threads formed thereon enmeshed with the internal threads formed in the cylindrical member securing said retainer in said cylindrical tube and for urging said frusto-conical chucking member into engagement with the frusto-conical portion of said through-hole to urge the sides of said frusto-conical member together to retain and accurately center a bundle of fibers in said retainer and said tube.

4,421,383
OPTICAL FIBER CONNECTORS

W. John Carlsen, Boston, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Continuation of Ser. No. 112,991, Jan. 17, 1980, abandoned. This application Nov. 8, 1982, Ser. No. 440,139
Int. Cl.³ G02B 7/26
U.S. Cl. 350—96.21 29 Claims



15. In combination,

(A) a first optical fiber connector for a first optical fiber having a first diameter comprising

(1) an optical fiber connector body molded of optical quality transparent plastic having

(a) a planar, annular, reference surface,

(b) a lens having a convex surface molded into said connector body, recessed inward from said reference surface,

(c) a third surface forming a focal plane of said lens, and having a point thereon one focal length from said lens surface, said third surface being parallel to said reference surface, and

(d) a substantially cylindrical cavity, having a second diameter, recessed from a fourth surface, and a smaller cavity further recessed therewithin terminating at said third surface, said point lying on an axis of said cylindrical cavity, and

(2) a precision molded elastomeric optical fiber holder, for holding said first optical fiber, said fiber holder comprising a molded cylindrical piece of elastic material having a third diameter and having an axial hole of a fourth diameter from one end of said piece to another end thereof, said molded piece having said hole tapered to a fifth diameter near one only of said ends,

wherein said fifth diameter is greater than each of said first diameter and said fourth diameter, and

wherein, prior to insertion of said first fiber, said fourth diameter is smaller than said first diameter;

(B) a second optical fiber connector for a second optical fiber having a sixth diameter comprising

(1) an optical fiber connector body molded of optical quality transparent plastic having

(a) a planar, annular, reference surface adapted to engage with said first optical fiber connector body reference surface,

(b) a lens having a convex surface molded into said second connector body, recessed inward from said second body reference surface,

(c) a seventh surface forming a focal plane of said second connector body lens, and having a point thereon one focal length from said second connector body lens surface, said seventh surface being parallel to said second connector body reference surface, and

(d) a substantially cylindrical cavity, having a seventh diameter, recessed from an eighth surface, and a smaller cavity further recessed therewithin terminating at said seventh surface, said seventh surface point lying on an axis of said second connector body cylindrical cavity, and

(2) a second precision molded elastomeric optical fiber holder, for holding said second optical fiber, said second fiber holder comprising a molded cylindrical piece of elastic material having an eighth diameter and having an axial hole of a ninth diameter from one end of said second fiber holder piece to another end thereof, said second fiber holder piece having its axial hole tapered to a tenth diameter near one only of its said ends,

wherein said tenth diameter is greater than each of said sixth diameter, and said ninth diameter, and

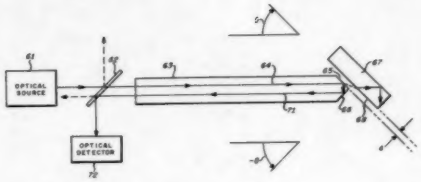
wherein, prior to insertion of said second fiber, said ninth diameter is smaller than said sixth diameter; and

(C) means for joining said first optical connector to said second optical connector so that said first optical connector planar annular reference surface engages with said second optical connector planar annular reference surface.

4,421,384
FIBER OPTIC TRANSDUCER

Donald H. McMahon, Carlisle, Mass., assignor to Sperry Corporation, New York, N.Y.

Continuation of Ser. No. 63,504, Aug. 3, 1979, abandoned. This application Jul. 27, 1981, Ser. No. 286,812
Int. Cl.³ G02B 5/14; G01D 5/34
U.S. Cl. 350—96.29 7 Claims



1. A fiber optic transducer for sensing ambient conditions comprising:

first and second optical fibers constructed of optical transparent material with substantially equal refractive indices n_1, each having a longitudinal axis and a planar end face oriented at a preselected angle with respect to said longitudinal axis;

means for positioning said optical fibers with said longitudinal axes in substantial alignment and said end faces in substantially parallel relationship with a separation space having a variable separation distance therebetween that changes as a function of said ambient conditions; and

an optical transparent medium with refractive index n_2 less than n_1 substantially spanning said variable separation space, said refractive indices n_1 and n_2 and said preselected angle chosen such that optical signals propagating in said first optical fiber are incident to said planar end face thereof at angles of incidence that are at least equal to a critical angle θ_C, defined by $\sin \theta_C = n_2/n_1$, such that optical signals incident to said planar end face of said first optical fiber with wavelengths shorter than said variable separation distance are substantially totally reflected and optical signals incident to said planar end face with wavelengths greater than said variable separation distance are coupled across said variable separation distance to propagate in said second optical fiber with an intensity level that varies inversely with said variable separation distance.

4,421,385
POLYGON MIRROR FOR USE WITH LASER BEAM SCANNING APPARATUS INCLUDING MEANS FOR HANDLING AND STORING THE MIRROR

Ryoji Yamaguchi, Yutakamachi, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

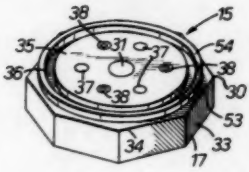
Filed Jun. 30, 1981, Ser. No. 280,051
Claims priority, application Japan, Aug. 4, 1980, 55-109740; Aug. 4, 1980, 55-109741; Oct. 8, 1980, 55-141006
Int. Cl.³ G02B 7/18
U.S. Cl. 350—299 8 Claims

1. A polygon mirror for use with laser beam scanning apparatus comprising:

a body having a regular polygonal cross section, each facet of the polygon having a mirror surface;

an axial aperture through said body for receiving a rotatable driving shaft;

projection means on the upper surface of said body for gripping, during handling of the mirror without touching said facets, said projection means including a circular projection coaxial with said aperture;



a ring also coaxial with said aperture and also extending upwardly from the upper surface of said body and surrounding said circular projection, said circular projection and said ring being separated by a groove, one wall of said groove forming at least a portion of the surface of the circular projection; and

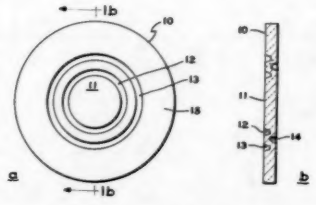
wherein said circular projection and said ring have substantially the same height.

4,421,386

STRESS-FREE WINDOW FOR LASER APPLICATIONS

Theodore J. Podgorski, St. Paul, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Mar. 3, 1982, Ser. No. 354,415
Int. Cl.³ G02B 5/00
U.S. Cl. 350—319 **2 Claims**



1. A stress-free optical element for laser applications comprising:

a unitary disc-like transparent optical element having both a relatively stress-free central area for transmission of a light beam as well as a surrounding mounting area near the periphery;

a plurality of concentric grooves formed in the element surface on one side of the element; and,

at least one further concentric groove formed in the element surface on the opposite side of the element and of radius different from the intermediate said plurality of concentric grooves, said grooves forming a spring-like portion in said unitary optical element to effectually mechanically decouple said stress-free central area from said surrounding area.

4,421,387

EXTENDED THIN FILM LIGHT MODULATOR/SCANNER

Robert A. Sprague, Saratoga, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 12, 1981, Ser. No. 224,243
Int. Cl.³ G02F 1/03
U.S. Cl. 350—356 **7 Claims**

1. In an electro-optic line printer (11) having a multi-gate light valve (50) for phase front or polarization modulating a sheet like, collimated light beam (48) in accordance with input data samples of finite duration representing individual picture elements of an image, and phase or polarization sensitive optics (31) for imaging the modulated light beam onto a photosensitive recording medium (14) as said recording medium advances in a cross line direction relative to said light valve, whereby said recording medium is exposed in an image configuration, wherein the improvement is characterized by:

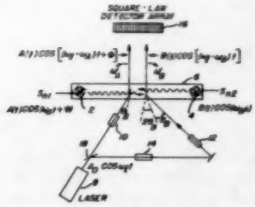
said light valve (50) comprising a substrate (52) containing an optically transmissive electro-optic film (54), drive electrodes (60, 62) in the form of a plurality of individually addressable electrodes formed on said electro-optic film (54) such that when said light beam is guided by said optically transmissive electro-optic element, said light completely passes under said drive electrodes, said individually addressable electrodes creating electric fringe fields within said electrooptic element to phase front or polarization modulate said light beam.

4,421,388

ACOUSTO-OPTIC TIME INTEGRATING FREQUENCY SCANNING CORRELATOR

Norman J. Berg; Irwin J. Abramovitz, both of Baltimore; Michael W. Casseday, Greenbelt, and John N. Lee, Silver Spring, all of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 6, 1981, Ser. No. 251,605
Int. Cl.³ G02F 1/11
U.S. Cl. 350—358 **8 Claims**



1. A two-dimensional frequency scanning correlator for correlating first and second signals which are shifted in frequency or time with respect to each other, comprising:

acousto-optic interaction means for defracting light by sound;

first, second, third and fourth acoustic transducer means disposed on said acousto-optic interaction means for converting electrical signals to sound;

means for applying first and second modulated carrier high frequency A.C. signals respectively to said first and second transducer means, the modulation of said first A.C. signal corresponding to said first electrical signal and the

modulation of said second A.C. signal corresponding to said second electrical signal;

means for applying third and fourth high frequency A.C. signals respectively to said third and fourth transducer means;

laser means for providing a coherent light beam, from which first, second, third and fourth coherent light beams are derived;

means for directing said first and second light beams across said acousto-optic interaction means for interaction respectively with said first and second A.C. signals in a first dimension of an orthogonal coordinate system;

means for directing said third and fourth light beams across said acousto-optic interaction means for interacting respectively with said third and fourth A.C. signals in a second dimension which is perpendicular to said first dimension;

time integrating photodetector means for detecting the interference of the light beams;

means for directing beams derived from said third and fourth beams at said photodetector means after said third and fourth beams interact with said third and fourth A.C. signals; and

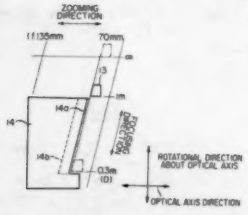
wherein said acousto-optic interaction means is comprised of first, second and third discrete acousto-optic interaction media elements, said first and second elements having said first and second modulated carrier A.C. signals respectively applied thereto, and said third element having said third and fourth A.C. signals applied thereto.

4,421,389

MACRO ZOOM LENS BARREL

Takeshi Muryoi, Chigasaki, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Oct. 2, 1981, Ser. No. 308,110
Claims priority, application Japan, Oct. 8, 1980, 55-139931
Int. Cl.³ G02B 7/10
U.S. Cl. 350—429 **4 Claims**



1. A zoom lens barrel having a single operating ring for effecting focusing by rotating operation of the operating ring about the optical axis with respect to a fixed portion and zooming by moving operation of the operating ring in the direction of the optical axis, said zoom lens barrel comprising:

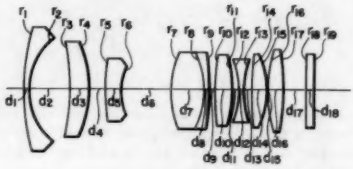
means provided between said operating ring and said fixed portion for limiting said operations by said operating ring, said means impeding said focusing with respect to an object lying at a shorter distance than a predetermined distance when said operating ring is in a position corresponding to a short focal length with a predetermined focal length longer than said short focal length as the boundary and impeding the zooming to said short focal length when said operating ring is in a position corresponding to the focusing with respect to the object lying at said shorter distance.

4,421,390

BRIGHT WIDE-ANGLE LENS FOR COMPACT COLOR VIDEO CAMERAS

Kyosuke Amano, Kurume, Japan, assignor to Asahi Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 8, 1981, Ser. No. 223,535
Claims priority, application Japan, Feb. 5, 1980, 55-12807
Int. Cl.³ G02B 9/64, 13/04
U.S. Cl. 350—459 **3 Claims**



1. A wide-angle lens system comprising nine lenses grouped in eight lens components, a first lens component including a negative meniscus lens convex toward the object, a second lens component including a positive meniscus lens concave toward the object, a third lens component including a negative meniscus lens convex toward the object, a fourth lens component including a positive cemented lens composed of a positive lens and a negative lens, a fifth lens component including a positive lens, a sixth lens component including a negative lens, a seventh lens component including a positive lens, and an eighth lens component including a positive lens wherein:

Aperture ratio 1:1.4 F=100 View angle 70.8°

r_1	470.236	d_1	15.97	N_1/ν_1	1.62230/53.2
r_2	155.922	d_2	104.44		
r_3	−649.982	d_3	49.95	N_2/ν_2	1.80518/25.4
r_4	−297.714	d_4	49.15		
r_5	535.971	d_5	36.86	N_3/ν_3	1.61800/63.4
r_6	113.778	d_6	131.96		
r_7	217.689	d_7	86.01	N_4/ν_4	1.70514/41.2
r_8	−190.178	d_8	14.01	N_5/ν_5	1.71736/29.5
r_9	−565.632	d_9	15.36		
r_{10}	841.143	d_{10}	44.60	N_6/ν_6	1.65830/53.4
r_{11}	−260.312	d_{11}	16.46		
r_{12}	−172.018	d_{12}	13.52	N_7/ν_7	1.80518/25.4
r_{13}	218.193	d_{13}	20.89		
r_{14}	801.641	d_{14}	38.09	N_8/ν_8	1.67790/55.3
r_{15}	−200.659	d_{15}	1.23		
r_{16}	276.716	d_{16}	37.60	N_9/ν_9	1.74400/44.7
r_{17}	−880.978	d_{17}	61.44		
r_{18}	∞	d_{18}	20.89	N_{10}/ν_{10}	1.49782/66.8
r_{19}	∞				

* face plate of television camera tube

$F_{1,2,3} = -158.900$
Backfocus = 179.002 where:

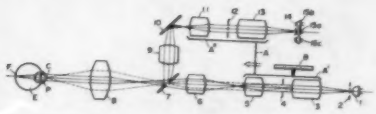
$r_1, r_2, \ldots r_{19}$ is the radius of curvature of each lens surface; $d_1, d_2, \ldots d_{18}$ is the lens thickness or the distance between the respective adjacent lenses; $N_1, N_2, \ldots N_{10}$ is the refractive index of each lens; $\nu_1, \nu_2, \ldots \nu_{10}$ is the Abbe number of each lens; and * is the face plate of the television camera tube.

4,421,391

AUTO EYE-REFRACTOMETER

Isao Matsumura, Yokosuka; Yasuyuki Ishikawa, Kawaguchi; Reiji Hirano, Yokohama; Shigeo Maruyama, Machida, and Yoshimi Kohayakawa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 26, 1980, Ser. No. 191,003
Claims priority, application Japan, Oct. 5, 1979, 54-128751
Int. Cl.³ A61B 3/10
U.S. Cl. 351—211 9 Claims



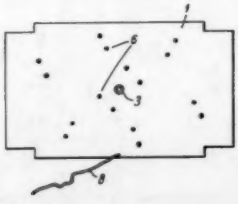
1. An auto eye-refractometer comprising:
marking means for forming linear marks orientated in at least three directions;
projection optical means for projecting the measuring beams emerging from said linear marks onto the fundus of an eye to be examined and having a projecting optical path;
first adjusting means disposed on said projecting optical path to move images of said linear marks along said projecting optical path;
receiving optical means for receiving the measuring beams emerging from said linear marks reflected from the fundus and having a receiving optical path;
detecting means having linear detecting areas for detecting each of the measuring beams passed through said receiving optical means;
second adjusting means disposed on said receiving optical path to focus the measuring beams on said linear detecting areas;
first beam limiting means disposed in said projecting optical path to limit the beams and having a light transmitting area provided on the optical axis; and
second beam limiting means disposed in said receiving optical path to limit the beams and having a light shading area provided on the optical axis.

4,421,392

APPARATUS FOR DETECTING VISUAL FIELD DEFECTS OF THE EYE

Ronald Pitts Crick, and Jonathan C. Pitts Crick, both of Pembroke House, Pembroke Rd., Sevenoaks, Kent, England

Filed Sep. 11, 1979, Ser. No. 74,809
Claims priority, application United Kingdom, Sep. 12, 1978, 36450/78
Int. Cl.³ A61B 3/02
U.S. Cl. 351—224 17 Claims



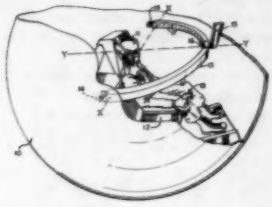
1. An apparatus for detecting visual field defects of an eye of a patient, said apparatus comprising:
means for displaying to a patient a visual stimulus comprising a plurality of spots having predetermined positions in the field of vision of the patient, each said spot having ill-defined edges to an extent such that said spot is incapable of being viewed by the patient as a sharply defined and outlined pattern regardless of the patient's visual acuity, said spots being characterized by stimuli which lack high frequency components and which contain only those frequencies necessary to give adequate separation of the closest stimuli.

4,421,393

VISUAL FIELD PERIMETER AND PSYCHOMOTOR TRACKING PERFORMANCE MEASURING APPARATUS

Malcolm M. Cohen; James J. Palumbo, both of Philadelphia; David C. Johanson, Warminster, and John G. Nelson, Newtown, all of Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 27, 1981, Ser. No. 257,683
Int. Cl.³ A61B 3/02
U.S. Cl. 351—224 8 Claims



1. Apparatus for simultaneously measuring a subject's visual field perimeter and psychomotor tracking ability, comprising, in combination:
first control means providing a first analog signal indicative of a preselected constant rate of change of the subject's angle of view;
second control means formed to be manipulated by the subject for providing a second analog signal indicative of the force applied thereto;
control means connected to recieve said first and second signals for providing a third digital signal indicative of the integrated sum of said first and second signals;
display means having a curved array of lights formed to subtend the subject's angle of view at equiangular positions about the angle bisector with opposed pairs of lights connected in parallel, and connected to receive said third signal for illuminating opposed pairs of said lights in response thereto.

4,421,394

DISPLACEMENT SYSTEM FOR AN OPTHALMOLOGIC EXAMINATION UNIT

Romuald Schön, 5, Werner-Seelenbinder-Str., Jena-Lobeda, District of Gera; Manfred Doms, 5, Zenkerweg; Peter Vorberg, 35, Luise-Seidler-Str., both of Jena, District of Gera, and Horst Schröter, 13, Bibraer-Landstr., Kahla, District of Gera, all of German Democratic Rep.

Filed Dec. 22, 1981, Ser. No. 330,679
Claims priority, application German Democratic Rep., Mar. 13, 1981, 228421
Int. Cl.³ A61B 3/00
U.S. Cl. 351—245 6 Claims

1. A displacement system for an ophthalmologic examination unit particularly for use in ophthalmologic examinations for displacing a base section relative to an accessory section, comprising
the base section having a top face and a leading edge,
the accessory section for mounting at least two ophthalmologic devices,
said accessory section having a bottom face and a leading edge,

said base section top face and

said accessory section bottom face being substantially in parallel opposition to each other at a spaced relation,

a first lever means having a first end point and a second end point,

a second lever means having a third end point and a fourth end point,

said first lever means and said second lever means being arranged between said top face and said bottom face substantially in planes parallel to the former and the latter,

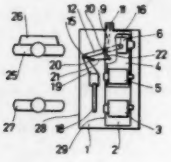
a first seating means, and a second seating means being provided at said top face of said base section,

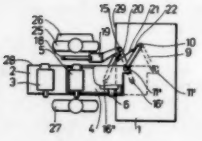
a third and a fourth seating means being provided at said bottom face of said accessory section,

said first lever means being connected via said first end point to said first seating means for rotation about the latter in one of said planes,

and being connected via said second end point to said third seating means for rotations about the latter in said one of said planes,

said second lever means being connected via said third end point to said second seating means for rotations about the latter in the other of said planes,





and being connected via said fourth end point to said fourth seating means for rotations about the latter in said other of said planes,

said first lever means and said second lever means being for displacing said accessory section relative to said base section,

said first lever means and said second lever means being crosswise arranged in a first end position of said accessory section relative to said base section,

and being substantially in parallel to each other in an intermediate position and a second end position, respectively, of said accessory section relative to said base section,

said first end point and said third end point having a first distance,

said second end point and said fourth end point having a second distance,

said first end point and said second end point having a third distance,

said third end point and said fourth end point having a fourth distance,

said first, second, third and fourth distance being different from each other,

the sum of the greatest of the distances and the shortest of said distances is greater than the sum of the remaining distances.

4,421,395

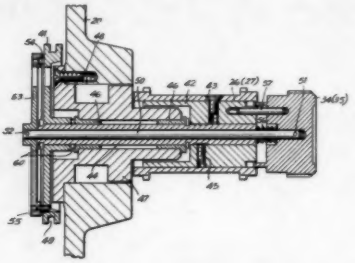
MOVIE CAMERA SPROCKET DRIVE MECHANISM

Fritz Bauer, Loquaiplatz 13/26, A-1060 Vienna, Austria

Continuation of Ser. No. 61,623, Jul. 30, 1979, abandoned. This application Aug. 24, 1981, Ser. No. 295,890

Int. Cl.³ G03B 1/56

U.S. Cl. 352—159 **6 Claims**



1. A sprocket drive mechanism for transporting film through a motion picture camera comprising a frame, a sprocket wheel rotatably supported on said frame adapted to engage said film, a drive plate rotatably supported on said frame and drive means for rotating said drive plate, knob means coupled to said sprocket wheel for rotation therewith, a coupling plate rotatably supported on said frame and axially coupled to said knob means for selectively rotating said knob means, said knob means, when manually actuated, axially displacing said coupling plate between a first position where said coupling plate is engaged with said drive plate for rotation therewith and a second position where said coupling plate is disengaged from said drive plate, said coupling plate, when in said first position, rotating said knob means which rotates said sprocket wheel, said knob means, when said coupling plate is in said second position, being manually rotatable to permit manual rotation of said sprocket wheel to adjust said film.

4,421,396

FOCUSSING APPARATUS FOR CAMERA

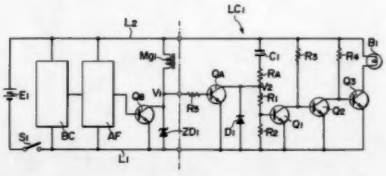
Minoru Matsuzaki, Hachioji, Japan, assignor to Olympus Optical Company Ltd., Japan

Filed May 25, 1982, Ser. No. 381,780

Claims priority, application Japan, Aug. 18, 1981, 56-129526

Int. Cl.³ G03B 3/00

U.S. Cl. 354—25 **7 Claims**



1. A focussing apparatus for a camera, comprising:

a focussing light source for directing a focussing light toward an object being photographed;

an in-focus detector circuit for determining an in-focus condition in response to the focussing light which it receives as the light is reflected by the object being photographed; and

a light source control circuit for deenergizing the focussing light source in response to an in-focus detection signal fed

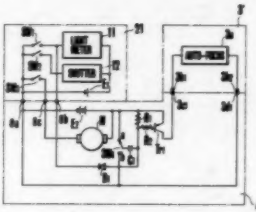
from the in-focus detector circuit and indicating an in-focus condition.

4,421,397

AUTOMATIC FOCUSING SYSTEM WITH INTERCHANGEABLE LENS

Toshikazu Ichiyanagi, Mitaka, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 26, 1982, Ser. No. 362,310
Claims priority, application Japan, Apr. 3, 1981, 56-48658[U]
Int. Cl.³ G03B *3/00, 1/18*
U.S. Cl. 354—400 **4 Claims**



1. A photographic system comprising:
a photographic arrangement including:
a camera body, a lens assembly, and automatic focusing means to control a photo-taking lens to an in-focus position, said arrangement further comprising:
(A) first switching means closed by a release operation at the camera body;
(B) first signal terminals to supply power to said automatic focusing means; and
(C) an accessory unit having an electric power source to supply electric power to the automatic focusing means and being attachable to and detachable from the photographic arrangement;
said accessory unit further comprising:
(c1) second signal terminals connected to the first signal terminals;
(c2) charging means to be charged and to generate a prescribed level of potential difference at the second signal terminals by a closing of the first switching means; and
(c3) second switching means connected to said charging means to effect a charging or discharging operation of the charging means.

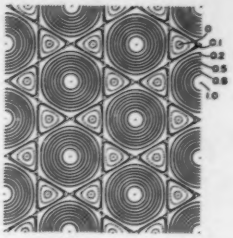
4,421,398

FOCUSSING PLATE

Takashi Suzuki; Kiyoshi Iizuka, both of Yokohama; Keiji Obtaka, Tokyo, and Hidemasa Mizutani, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 278,220, Jun. 26, 1981, abandoned. This application Mar. 14, 1983, Ser. No. 473,266
Claims priority, application Japan, Jun. 27, 1980, 55-88027; Jun. 27, 1980, 55-88030
Int. Cl.³ G03B *13/02*
U.S. Cl. 354—200 **16 Claims**

1. A focussing plate for use in a camera, comprising:
a. a plurality of micro-lens shaped curved surfaces arranged on a substrate with each surface having a pitch in the range from 5 to 30 μm; and
b. a plurality of curved surfaces positioned on the substrate in boundary spaces separating said micro-lens shaped



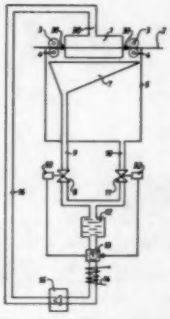
curved surfaces, and having a curvature opposite to that of said micro-lens shaped curved surfaces.

4,421,399

PROCESSING ARRANGEMENT FOR PHOTOSENSITIVE ARTICLES INCLUDING A HEATER AND A FLUID CONTROL DEVICE

Fritz Steube, Buenos Aires Central, Argentina, assignor to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Dec. 23, 1982, Ser. No. 452,640
Claims priority, application Fed. Rep. of Germany, Dec. 30, 1981, 3151949
Int. Cl.³ G03B *3/06*
U.S. Cl. 354—299 **24 Claims**



1. An arrangement for processing photosensitive articles, particularly for developing film and the like, comprising:
(a) processing means having inlet and outlet means for a processing fluid;
(b) container means for the processing fluid arranged to receive fluid discharged from said outlet means, said container means including first and second containers which respectively accommodate part of the fluid, and said first and second containers respectively having first and second outlets;
(c) conduit means connecting said first and second outlets with said inlet means;
(d) pump means for circulating the fluid;
(e) heating means for heating the fluid;
(f) flow regulating means for regulating the flow of fluid from said first container to said heating means, said regulating means having a first position in which said first outlet is closed to prevent fluid flow from said first container to said heating means, and said regulating means having a second position in which said first outlet is open to permit fluid flow from said first container to said heating means; and

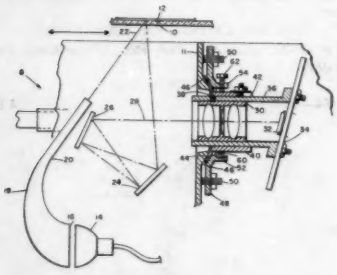
(g) automatic control means for said regulating means operative to maintain the latter in said first position until the fluid from said second container is heated to a predetermined temperature, said control means also being operative to move said regulating means to said second position when the fluid from said second container reaches the predetermined temperature.

4,421,400

FOLDED BEAM ADJUSTMENT

Hugh St. L. Dannatt, Bethel, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed May 14, 1982, Ser. No. 378,038
Int. Cl.³ G03B 27/00
U.S. Cl. 355—1 **3 Claims**



1. In an optical scanning system for scanning an original document to be copied, said system including (a) a carrige, (b) an array of fiber optics for illuminating said original document with a line of light, (c) a first mirror, (d) a second mirror opposing said first mirror and forming an acute angle therewith, said mirrors being separated by a predetermined distance, whereby one end of said mirrors is more open than the other end of said mirrors and input light rays enter at the more open end of said mirrors upon said first mirror at a predetermined angle, and wherein said light rays are reflected off each of said mirrors a predetermined multiplicity of times and exit said mirrors at the more open end by reflecting off said second mirror at the same predetermined angle the input rays make with said first mirror, and (e) a lens cell for focusing said line of light upon a light sensitive surface, an improved adjustment mechanism for said lens cell, said improved adjustment mechanism comprising:

i. an inner barrel member surroundingly engaging said lens cell;

ii. an outer barrel member slidingly retaining said inner barrel member, said outer barrel member having a flared end;

iii. a two dimensionally contoured ring surface on said carriage on which said flared end of said barrel member is seated;

iv. means for longitudinally sliding said inner barrel member within said outer barrel member; and

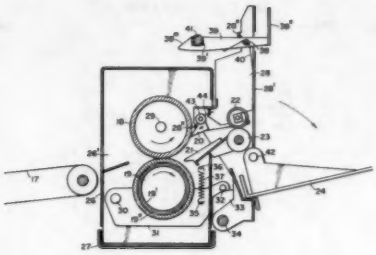
v. means for swivelling the outer barrel member vertically and laterally.

4,421,401

IMAGE RECORDING APPARATUS

Kazuo Kagiura, Tokyo; Hiroyuki Miyake, Inagi; Nobuhiro Kasama, Yokohama; Seiji Sagara, Kawasaki; Nobukazu Sasaki, Tokyo, and Takaji Yonemori, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 12, 1981, Ser. No. 262,955
Claims priority, application Japan, May 16, 1980, 55-65710
Int. Cl.³ G03G 15/20
U.S. Cl. 355—3 FU **23 Claims**



1. An image recording apparatus comprising:

imaging means for forming a toner image corresponding to information to be recorded on an image supporting material;

first and second rotatable members, having a nip therebetween, for fixing said toner image while carrying said image supporting material in said nip;

a first power transmitting member mechanically connected with said first rotatable member for rotating the same when said first power transmitting member is driven;

a second power transmitting member shiftable between an operative position in which said second power transmitting member co-operates with said first power transmitting member and an inoperative position in which said second power transmitting member is separated apart from said first power transmitting member, said second power transmitting member being adapted to transmit a driving force from a source of power to said first power transmitting member when said second power transmitting member is in said operative position;

discharge means selectively shiftable between a normal position in which the image supporting material fed from the nip between said first and second rotatable members is discharged by said discharge means and a temporal position in which said discharge means is retracted from said normal position;

cooperating means for transmitting the shift movement in said discharge means to said second power transmitting member, said cooperating means being adapted to shift said second power transmitting member between said operative and inoperative positions correspondingly when said discharge means is shifted between said normal and temporal positions; and

a manually operable member mechanically connected to at least one of said first and second rotatable members to allow manual rotation of at least one of said first and second rotatable members.

4,421,402
ELECTROPHOTOGRAPHIC DEVICE

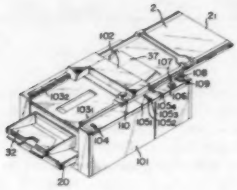
Shigehiro Komori; Hisashi Sakamaki, both of Yokohama; Hiroyuki Hattori, Mitaka; Toshihide Iida; Koichi Miyamoto, both of Tokyo, and Kazumi Umezawa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

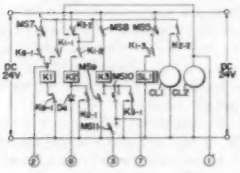
Continuation of Ser. No. 908,827, May 23, 1978, abandoned, which is a division of Ser. No. 778,180, Mar. 16, 1977, Pat. No. 4,185,909, which is a continuation of Ser. No. 600,860, Jul. 31, 1975, Pat. No. 4,017,170, which is a continuation of Ser. No. 348,092, Apr. 5, 1973, abandoned. This application May 6, 1980, Ser. No. 147,175

Claims priority, application Japan, Jun. 20, 1972, 47-7296119; Apr. 13, 1972, 47-3728819; Apr. 15, 1972, 47-3814919

Int. Cl.³ G03G *15/22, 15/28*

U.S. Cl. 355—8 **13 Claims**





1. A copying apparatus for performing a duplicating operation of an original document comprising:

a. an original document scanning means for scanning and transmitting an image of an original document to be duplicated, said scanning means comprising movable means for reciprocal movement along a scanning path defined by the limits of image transmission, wherein said movable means moves in a first direction for scanning the original and in a second direction opposite to the first direction, said movable means moving faster in the second direction than in the first direction;

b. receptor means for receiving said transmitted image and producing an intermediate image of the original document in response thereto, said receptor means comprising an endless surface moving cyclically along a fixed path, on which surface said intermediate image is produced;

c. a copy sheet feed means for presenting copy sheets to said surface containing said intermediate image in order to transfer said intermediate image of said original document onto said copy sheets;

d. detection means disposed in a predetermined position along the scanning path of said movable means for producing a detection signal in response thereto, said detection means including switch means actuatable by said movable means from a first state to a second state when said movable means moves in the first direction;

e. control means for moving said movable means in the first direction for scanning operation; and

f. means for actuating a copy sheet feed means in response to actuation of said switch means from the first state to the second state when said control means is in operation during the movement of said scanning means in the first direction.

4,421,403
ORIGINAL IMAGE PROJECTING APPARATUS

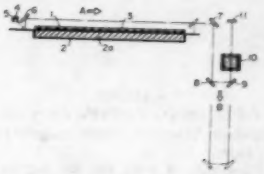
Tadashi Sato, Kokubunji; Haruo Tsunoi, Kawasaki, and Hirotoshi Kishi, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 152,735, May 23, 1980, abandoned. This application Feb. 24, 1982, Ser. No. 351,992

Claims priority, application Japan, May 29, 1979, 54-66658; May 29, 1979, 54-66659; May 29, 1979, 54-66660; May 29, 1979, 54-66662

Int. Cl.³ G03G *15/04*

U.S. Cl. 355—8 **14 Claims**



1. An original image projecting apparatus of the type in which an original is scanned and an image of the original is projected onto a photosensitive element, said apparatus comprising:

original supporting means for supporting an original thereon with a surface to be scanned of the original facing upwardly;

a scanning mirror for scanning the surface of the original;

a transparent plate for holding the original on said original supporting means and engageable on the surface of the original;

guide means for supporting one end of said scanning mirror, said guide means mounting said scanning mirror for movement in a scanning direction and for pivoted movement toward and away from an original supported on said original supporting means; and

means for focusing the image of an original on the photosensitive element.

4,421,404
JOB RECOVERY TECHNIQUE IN A DOCUMENT COPIER MACHINE

Douglas J. Conly, Boulder, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 4, 1982, Ser. No. 374,848

Int. Cl.³ G03G *15/00*

U.S. Cl. 355—14 CU **9 Claims**

1. The method of job recovery from a paper jam in a document copier machine with an automatic document feed device for feeding original documents from a stack of documents serially to a processing station for production of images thereof, said machine having a copy paper path, a plurality of image bearing copy sheets being simultaneously transportable serially through said path, said sheets carrying diverse images, said machine having a control system capable of detecting the number of recopies needed for each original when the machine is shut down due to a paper jam or other work stoppage, and the number of originals needed to be recopied, comprising the steps of:

clearing said copy paper path of all copy sheets present in

said path when a paper jam or other work stoppage occurs;

inhibiting further activity by said automatic document feed device, serially inserting N number of originals to be recopied into said processing station, N being a number greater than one;

producing the required number of recopies from each of said N number of originals to be recopied; and

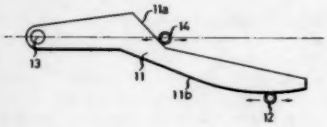
automatically reactivating said automatic document feed device upon the production of the last of the required number of recopies to resume the job suspended by the paper jam or other work stoppage and the recovery therefrom.

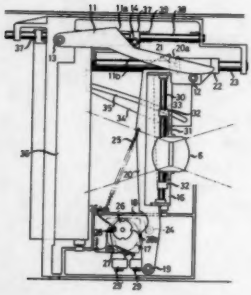
4,421,405

MULTIPLE MODE COPYING APPARATUS

Yasumori Nagahara, Yokosuka, Japan, assignor to Ricoh Company, Ltd., Japan

Filed May 26, 1982, Ser. No. 382,100
Claims priority, application Japan, May 27, 1981, 56-79150
Int. Cl.³ G03B *27/36*
U.S. Cl. 355—58 **2 Claims**





1. A multiple mode copying apparatus comprising:

drive means for moving a lens in the direction of a principle light beam;

conversion cam means for converting the distance covered by the movement of said lens into a rotational angle; and

mirror moving means for moving mirrors in accordance with said rotational angle;

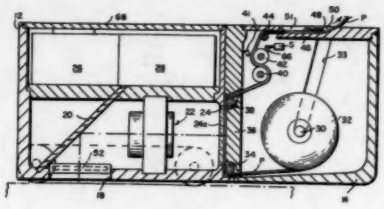
wherein the improvement resides in that said conversion cam means comprises a cam member formed with a first cam surface for deciding the distance to be covered by the movement of said mirrors, and a second cam surface for following up the distance covered by the movement of said lens, said second cam surface being profiled such that it is in the form of an arc such that when a cam follower moves past a point of contact of the cam follower for effecting copying without magnification and reduction, the direction of movement of the cam member is reversed by starting at said point of contact.

4,421,406

MOBILE COPIER

Sidney Feinleib, 87 Oakley Rd., Belmont, Mass. 02178

Continuation of Ser. No. 119,933, Feb. 8, 1980, abandoned. This application Jun. 17, 1982, Ser. No. 389,570
Int. Cl.³ G03B *27/48, 27/50, 27/70*
U.S. Cl. 355—84 **5 Claims**



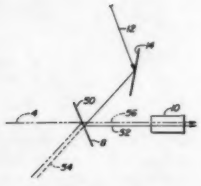
1. A mobile copier comprising a housing, rotatable means mounted to the housing with a portion thereof forming a surface movable in contact with the matter to be copied to traverse the housing relative to the matter to be copied, a printable paper, a fixing medium, means operative by movement of the housing as it is traversed accross the matter to be copied to move corresponding lengths of the paper into position for exposure and an optical train including a reflector for receiving and focusing successive increments of the material to be copied as successive lengths of the printable paper are moved into position to expose the latter to the image of the matter to be copied, wherein the housing comprises two separable sections, wherein the rotatable means is mounted to one of the sections and one of said sections contains the optical train, the printable paper and the fixing medium, and wherein the module containing the printable paper embodies a blade and means for guiding the paper over the edge of the blade.

4,421,407

IMAGE COMBINING SEXTANT OR THE LIKE

Angus MacDonald, Oakland, Calif., assignor to Davis Instruments, San Leandro, Calif.

Continuation of Ser. No. 75,869, Sep. 17, 1979, abandoned. This application Apr. 22, 1981, Ser. No. 256,464
Int. Cl.³ G01C *1/08*
U.S. Cl. 356—144 **8 Claims**



1. In a sextant for measurement of the angle between distant objects of the type wherein said sextant includes a first optical path means for receiving light from a first horizon object, a second optical path means from receiving light from a second celestial body object at a vertical angular distance from said first object, said first and second optical path means each including means for producing images of said respective objects and for measuring the angle therebetween, and means for registering the respective images of said objects to obtain accurate measurement of the angle between said objects, the improved registering means comprising:

a spectrally selective beam combining mirror that is at least partially transmissive to enable light from said horizon object to combine with reflected light from said second

celestial body object so that the joint output of said beam combining mirror is a superimposed image of said respective first and second objects covering the full field of view;

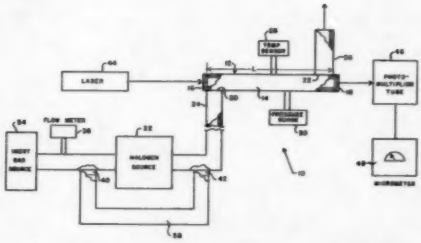
said beam combining mirror having predominately reflective characteristics in the blue-green-yellow range corresponding to wavelengths from said second celestial body object, and predominately transmissive characteristics to visible light in all other ranges above and below the blue-green-yellow range from said first horizon object whereby there is produced an enhanced superimposed image of said first and second objects over the full field of view.

4,421,408

HALOGEN MASS FLOW RATE DETECTION SYSTEM

Steven J. Davis, and Leonard Hanko, both of Albuquerque, N. Mex., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 23, 1981, Ser. No. 237,021
Int. Cl.³ G01N *1/22, 21/85*
U.S. Cl. 356—246 **10 Claims**



1. A halogen mass flow rate detection system comprising an absorption cell, means connected to said absorption cell for passing either an inert gas or a halogen entrained inert gas thereinto, means connected to said absorption cell for passing either said inert gas or said halogen entrained inert gas out of said absorption cell, means adjacent one end of said absorption cell for providing a beam of electromagnetic radiation at a predetermined wavelength and for passing said beam of radiation through said absorption cell, said wavelength being in the bound-continuum region and said radiation being at a predetermined power, means adjacent the other end of said absorption cell for receiving said beam of electromagnetic radiation passing through said absorption cell and for detecting the intensity thereof, and means operably connected to said absorption cell for measuring the pressure of said inert gas passing therethrough, whereby a relationship between the detected intensity of said electromagnetic beam of radiation passing through only said inert gas and the detected intensity of said electromagnetic beam of radiation passing through said halogen entrained inert gas can be established, so as to then determine said halogen mass flow rate.

4,421,409

OPEN AREA RATIOMETER

Fred M. Dickey, Derby, and Darrell M. Postlethwaite, Wichita, both of Kans., assignors to The Boeing Company, Seattle, Wash.

Filed Oct. 14, 1980, Ser. No. 196,689
Int. Cl.³ G01B *9/02*
U.S. Cl. 356—354 **7 Claims**

1. An improved apparatus for optically measuring the percent of open area in a perforated sheet, the apparatus comprising:

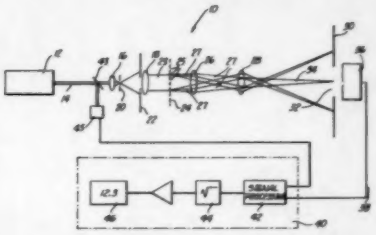
a quasi-monochromatic light source for directing a light outwardly therefrom;

means for collimating the light received from the light source and disposed in front of the light source;

a light diffraction optical lens disposed in front of and in a spaced relationship from the light collimating means so the perforated sheet can be received therebetween, the lens receiving diffracted light which is passed through the perforations in the perforated sheet;

a relay magnifying optical lens disposed in front of the light diffraction lens for receiving and magnifying the diffracted light therefrom;

a light diffraction aperture plate disposed in front of the relay magnifying lens for receiving the magnified diffracted light therefrom, the size of the aperture in the light diffraction aperture plate being small enough to receive only a small central portion of the diffracted light from the perforated sheet;



a first light detector mounted in front of the aperture in the light diffraction aperture plate for receiving the small central portion of the diffracted light received therethrough; and

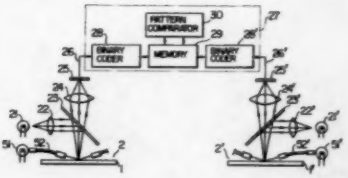
electronic means electrically connected to the first light detector for receiving and measuring electrically the amount of diffracted light of the small center portion and converting electronically this amount to a percent of open area in the perforated sheet.

4,421,410

METHOD AND APPARATUS FOR INSPECTING PRINTED WIRING BOARDS

Koichi Karasaki, Hadano, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 22, 1980, Ser. No. 171,265
Claims priority, application Japan, Jul. 23, 1979, 54-92676
Int. Cl.³ G01B *11/00, 11/24*
U.S. Cl. 356—378 **14 Claims**



1. An apparatus for inspecting printed wiring boards wherein a wiring pattern on a printed wiring board is inspected by detecting light reflected from a wiring surface of the printed wiring board, said apparatus comprising:

first illuminating means for illuminating the wiring surface of the printed wiring board with light substantially normal to the wiring surface;

second illuminating means for illuminating the wiring surface of said printed wiring board with light at a large incident angle; and

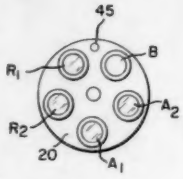
means for deciding whether a defect exists in a wiring pattern on said wiring surface by receiving the light reflected from said wiring surface as a result of the light illumination by the first and second illuminating means.

4,421,411

PHOTOMETRIC ANALYZER

Edward S. Ida, Newark, Del., assignor to E. I. Du Pont de Nemours & Co., Wilmington, Del.

Filed May 7, 1981, Ser. No. 261,483
Int. Cl.³ G01J *3/48*; G01D *5/36*
U.S. Cl. 356—418 **4 Claims**



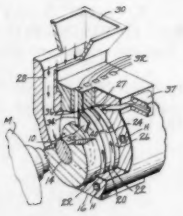
1. In a spectral photometer including a filter wheel driven by a synchronous motor, the improvement comprising speed changing means between the motor and filter wheel for rotating the filter wheel one revolution in the time required for an odd number of power half-cycles to the motor.

4,421,412

PROCESS AND APPARATUS FOR PROCESSING PLASTIC AND POLYMERIC MATERIALS

Peter Hold, Milford, Conn.; Zehev Tadmor, Haifa, Israel, and Lefteris N. Valsamis, West Haven, Conn., assignors to USM Corporation, Farmington, Conn.

Continuation-in-part of Ser. No. 971,332, Dec. 20, 1978, abandoned. This application Nov. 24, 1982, Ser. No. 444,497
Int. Cl.³ B01F *5/12, 7/10*; B29B *1/06, 3/02*
U.S. Cl. 366—76 **34 Claims**



1. Apparatus for processing particulate materials which become liquids in the course of processing, and which comprises:

a rotatable element carrying at least one annular processing channel including opposed side walls having inner wall surfaces;

a stationary element providing a coaxial surface cooperatively arranged with the processing channel to form an enclosed annular processing passage, the stationary element also having associated with it an inlet for feeding particulate material to the passage, an outlet spaced apart from the inlet for discharging material from the passage, a member providing an end wall surface positioned near the outlet of the passage, a first restraining member having side surfaces positioned between the inlet and the end wall surface and providing a particulate material restraining surface and shaped to provide a clearance between the sides of the first restraining member and inner wall surfaces of the processing channel, the end wall surface and the restraining surface being positioned in the passage to provide a space for collecting a pool of liquid material between the end wall surface and the restraining surface which can at least wet sufficient area of the inner surfaces of the processing channel to generate discharge pressure;

means positioned in the space for collecting a pool of liquid material for occupying a predetermined portion of the space to provide a pool space of predetermined geometry designed to provide preselected discharge pressure characteristics for liquid material collected in the pool space; and

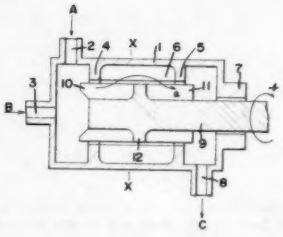
means to rotate the rotatable element in a direction from the inlet toward the first restraining member.

4,421,413

APPARATUS FOR CONTINUOUSLY EMULSIFYING THE LIQUIDS

Hideo Sekiguchi, Maebashi, Japan, assignor to Sekiguchi Co., Ltd., Tokyo, Japan

Filed Sep. 28, 1981, Ser. No. 306,628
Int. Cl.³ B01F *7/02*
U.S. Cl. 366—307 **3 Claims**

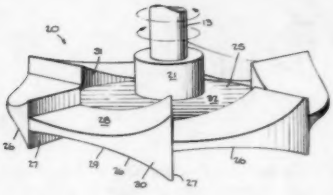


1. Apparatus for continuously emulsifying water and fuel oil comprising a casing having inlets for water and fuel oil in one end thereof and an emulsified fuel outlet at the other end thereof, a plurality of circumferential ribs formed on the inner wall of said casing longitudinally spaced from one another, a plurality of radially equidistant protrusions formed on the inner surface of said casing, each of said protrusions extending in a longitudinal direction and having the same inner diameter as that of said circmferential ribs, said protrusions intersecting said circumferential ribs to thereby provide a plurality of deep slits in said inner wall of said casing, and an impeller rotatably and concentrically disposed in said casing, said impeller consisting of a rotating shaft and at least a first and second plurality of circumferentially spaced-apart agitator blades mounted on said rotating shaft forming a deep impeller space between each two blades, said first plurality of agitator blades being longitudinally spaced from said second plurality of agitator blades, said agitator blades having an outer diameter slightly smaller than the inner diameter of said circumferential ribs thus providing gaps between said blades and said ribs, said impeller having at least one disc element disposed between said first and said second plurality of agitator blades, said disc element having an outer diameter corresponding to the outer diameter of said agitator blades, said disc element having a radial length substantially equal to the radial length of said agitator blades, said disc element having a longitudinal width less than the longitudinal length of said deep slits on said casing, whereby liquid passes between said deep impeller space in said impeller and said deep slits in said casing in a generally zigzag manner without increasing the flow resistance of the liquid passing therethrough.

4,421,414
HIGH EFFICIENCY MIXING METHOD

Darrell Holupko, Fairport, N.Y., assignor to General Signal Corporation, Stamford, Conn.

Continuation of Ser. No. 134,019, Mar. 5, 1980, abandoned. This application Dec. 31, 1981, Ser. No. 336,120
Int. Cl.³ B01F 7/16
U.S. Cl. 366—348 1 Claim



1. A process for agitating liquids having different viscosities by an impeller driven at substantially the same given speed for either direction of rotation comprising the steps of:

(a) agitating a liquid of relatively light viscosity by rotating the impeller in a given direction at said given speed, the impeller having a plurality of blades substantially longer than they are wide disposed in end-to-end relationship about the periphery of a disc of the impeller, the blades having first longitudinal arcuate flow inducing surfaces for inducing flow primarily when the impeller is rotated in said given direction and second flat end flow inducing surfaces for inducing flow primarily when the impeller is rotated in the opposite direction,

(b) introducing a substance into the liquid, whereby its viscosity is increased,

(c) changing the direction of rotation of the impeller upon increase in the viscosity of the liquid to render the second flat end flow inducing surface primarily effective to induce flow rather than said first longitudinal arcuate flow inducing surface to reduce load on the impeller when rotated at said given speed in said opposite direction,

(d) whereby load on the impeller is reduced at said increased viscosity of the liquid upon changing the direction of rotation of the impeller to prevent overload of the impeller, without requiring reduction in the speed of rotation of the impeller.

4,421,415
COIN CLOCK

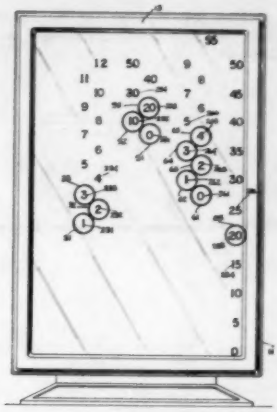
Adolph E. Goldfarb, 4614 Monarca Dr., Tarzana, Calif. 91356

Filed Feb. 11, 1982, Ser. No. 347,941
Int. Cl.³ G04B 19/00
U.S. Cl. 368—62 20 Claims

1. A clock mechanism for use with counting tokens and comprising:

means defining generally vertically disposed channels adapted to guide and hold visible accumulations of such tokens;

time indicia associated with and in front of the channels, each indicium adapted to be generally inconspicuous when no such token is behind it, and each indicium adapted to be made conspicuous by such a token held behind it in the associated channel; and

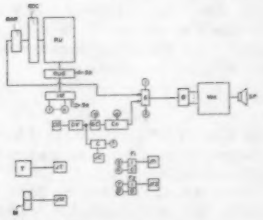


synchronously driven apparatus for delivering such tokens to the channels, at a substantially constant rate, for accumulation therein.

4,421,416
SPEECH SYNTHESIZER TIMEPIECE WITH A SINGLE COMMAND SWITCH

Shintaro Hashimoto, Ikoma; Akitaka Morita, Nara, and Hiroshi Tsuda, Uji, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Feb. 19, 1981, Ser. No. 236,067
Claims priority, application Japan, Feb. 19, 1980, 55-20873[U]
Int. Cl.³ G04B 21/08; G04F 8/00
U.S. Cl. 368—63 2 Claims



1. A speech synthesizer timepiece capable of providing an audible indication of time information comprising in combination:

a timekeeping means for performing a timekeeping operation;

a speech synthesizer means for providing an audible indication of the results from said timekeeping means; and

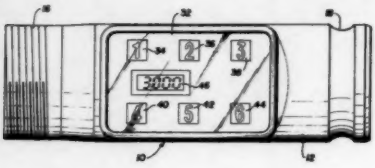
a singular key switch means which, upon first actuation, starts a stop watch mode of operation with the development of an audible message and which, upon a second or subsequent actuation, delivers an audible readout of the elapsed time in the form of said preceding audible message.

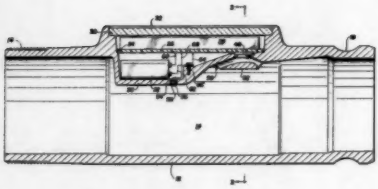
4,421,417

FLUID DELIVERY MONITOR

Thomas F. McQuade, 11 Windham Loop, Staten Island, N.Y. 10314

Filed Sep. 19, 1980, Ser. No. 188,850
Int. Cl.³ G04B *1/26*; G04F *8/00*
U.S. Cl. 368—65 **2 Claims**





1. A fluid delivery monitor comprising:

a housing including a flow channel;

flow sensor means in said housing for providing a flow signal in response to fluid flow in said flow channel;

accumulative means having a count input, reset terminal and store terminal responsive to said flow signal from said flow sensor means for accumulating the elapsed time of said flow signal;

clock means having an output connected to said count input of said accumulative means; and

code means for controlling said accumulative means in response to receipt of a preselected code, wherein said accumulator means includes a display and a logic decoding section and said code means enables said accumulator means in response to a receipt of a first preselected code to display said accumulated elapsed time and said logic decoding section of said accumulator means controls said reset terminal and said store terminal, and wherein said code means resets said accumulator means in response to receipt of a second preselected code.

4,421,418

CLOCK ADJUSTMENT SWITCH SYSTEM

Hideki Morishima, Saitama, Japan, assignor to Rhythm Watch Co., Ltd., Tokyo, Japan

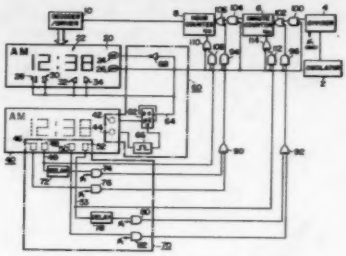
Filed Apr. 2, 1982, Ser. No. 364,678
Claims priority, application Japan, Apr. 6, 1981, 56-50012[U]; Apr. 9, 1981, 56-51789[U]; Apr. 10, 1981, 56-52462[U]
Int. Cl.³ G04C *17/00, 9/00*; G06F *3/14*
U.S. Cl. 368—69 **6 Claims**

1. A clock adjustment switch system for a clock having a display panel covered by a transparent cover, comprising:

a clock adjustment means for adjusting a function of said clock and having least one clock adjustment switch constituted as a transparent touch-switch provided on said transparent cover,

a clock adjustment means control means for selectively making said clock adjustment means operative or inoperative,

at least one luminous indicator means formed as a character or symbol provided on said display panel at a position corresponding to the position of said at least one clock adjustment switch, said luminous indicator means being lit to indicate the position of said clock adjustment switch



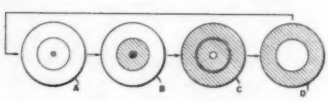
only when said clock adjustment means control means makes said clock adjustment means operative.

4,421,419

ELECTRONIC TIMEPIECE

Morio Morishige, Hachioji, and Hironao Sone, Kodaira, both of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 202,861, Oct. 31, 1980, abandoned.
This application Apr. 21, 1983, Ser. No. 486,452
Claims priority, application Japan, Nov. 12, 1979, 54-145365
Int. Cl.³ G04B *23/02*; G04C *17/02*
U.S. Cl. 368—73 **14 Claims**



1. An electronic timepiece with dynamic pattern display comprising:

time counting means for dividing a reference clock signal and for providing time data;

display means coupled to said time counting means and having a plurality of optical display elements arranged in a geometric pattern for displaying time in an analog fashion, said displayed time being based on said time data from said time counting means;

alarm signal output means coupled to said time counting means for generating a first alarm signal when said time data from said time counting means reaches a predetermined first time and for generating a second alarm signal when said time data from said time data counting means reaches a predetermined second time;

sound producing means coupled to said alarm signal output means for producing an alarm sound in response to an output signal from said alarm signal output means; and

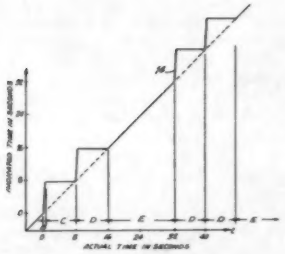
display control means coupled to said display means and to said alarm signal output means, and which is responsive to said first alarm signal for causing said display means to produce an alarm display as a first dynamic pattern display mode which differs from a normal time display mode, said display control means being responsive to said second alarm signal from said alarm signal output means for causing said display means to produce an alarm display of a second dynamic pattern display mode which differs from said normal time display mode and which also differs from said first dynamic pattern display mode.

4,421,420

ELECTRONIC TIMEPIECE WITH ANIMATION

Kenichi Ushikoshi, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Jul. 7, 1981, Ser. No. 281,156
Claims priority, application Japan, Jul. 9, 1980, 55-96362[U]
Int. Cl.³ G04B 19/06, 25/06
U.S. Cl. 368—229 15 Claims



1. In an electronic timepiece having a source of high frequency standard signals, a timekeeping divider circuit dividing down said high frequency standard signals to a timekeeping signal of a lower frequency, a motor, means for driving said motor in response to said timekeeping signals, a display including hands driven by said motor, the improvements therein comprising:

a dial and a second hand having illustrations thereon;

means for obstructing passage of said timekeeping signals to said motor driving means;

means for generating and inputting a secondary signal to said motor driving means, said timekeeping signals being obstructed, said secondary signals causing said motor to drive at an erratic rate, at least said secondary signals outputting a stop signal with a period longer than that of said timekeeping signal, said hands being stationary during said stop period, and a quick feed signal with a constant period shorter than that of said timekeeping signal;

total motion of said second hand produced by said stop signal and said quick feed signal causing said second hand to indicate the same accurate second display position as if driven over the same elapsed time by said timekeeping signal,

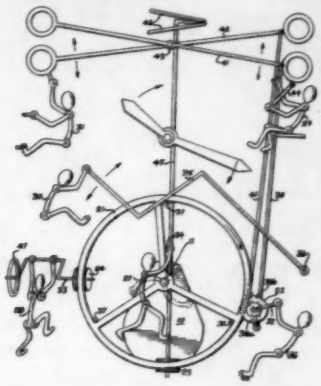
switch means for selecting one of said timekeeping signals and said secondary signals, at least one of said hands selectively moving with an erratic motion when said secondary signals are selected.

4,421,421

KINETIC CLOCK SCULPTURE

Gordon E. Bradt, Kinetico Center, Busch, Ark. 72620

Filed Feb. 23, 1982, Ser. No. 351,414
Int. Cl.³ G04B 19/06
U.S. Cl. 368—229 21 Claims



1. In a clock including minute and hour hands journalled for rotation in clockwise directions in vertical planes about a common axis, that is horizontally disposed and and extends normally of said vertical planes and of the action of gravity, and a timekeeping mechanism means for simultaneously driving said minute and hour hands at 1/60 rpm and 1/170 rpm, respectively, about said common axis, including a drive shaft therefor, means for rotating said drive shaft about its axis to drive same, and driving and driven gear wheel means intercoupled with said drive shaft and said minute and hour hands respectively for rotating same about their said common axis at their said respective speeds in said clockwise direction,

the improvement comprising a kinetic sculpture arrangement therefor comprising:

a drive gear wheel having an axis of rotation paralleling that of said common axis and driven by the drive shaft and about said axis of said drive gear wheel,

a driven gear wheel journalled for rotation about its axis and being coupled to said drive gear wheel for rotation thereby,

said kinetic sculpture arrangement driven gear wheel rotationally driving a crank about a horizontal axis, to move up and down in one direction in a circular path that is vertically disposed,

said drive gear wheel being relatively large and said driven gear wheel being relatively small,

and a drive gear wheel actuated mechanical linkage of miniature stick figure form articulated to said crank whereby said crank and said linkage comprise a kinetic sculpture device,

said linkage defining a stick figure comprising:

a stick figure body including a head at one end thereof, a shoulder cross pin carried by said body adjacent said head, and a hip cross pin paralleling said shoulder cross pin and carried by said body at the other end thereof,

a pair of stick figure arms carried by said shoulder cross pin, one on either side of said body, and at like ends of said arms,

and a pair of stick figure legs carried by said hip cross pin, one on either side of said body, and at like ends of said legs,

with the said linkage being disposed in upright relation adjacent to and at the level of said crank and having the other ends of said stick figure legs thereof anchored below said crank and the other ends of said stick figure arms

being articulated to said crank for following the rotation of same about said circular path,

said crank having a throw leverage that is a fraction of the radius of said kinetic sculpture arrangement drive gear wheel but exceeds that of said kinetic sculpture arrangement driven gear wheel,

and with said stick figure body, arms, and legs of said linkage being contoured, anchored and articulated in place for simulating front to back human like motion, in following the rotation of said crank about said circular path, suggestive of that said stick figure is assisting in driving said timekeeping mechanism means.

4,421,422

ELECTRONIC TIMEPIECE WITH VARIABLE MELODY ALARM FACULTIES

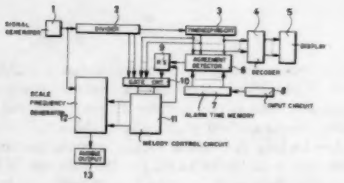
Kiyoshi Kumata, Tsuzuki, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 116,889, Jan. 30, 1980, abandoned. This application Nov. 23, 1981, Ser. No. 323,874

Claims priority, application Japan, Jan. 31, 1979, 54-11157

Int. Cl.³ G04B *21/00*; G10F *1/00*

U.S. Cl. 368—273 **10 Claims**



1. An electronic timepiece comprising:

alarm time sensing means for generating an alarm signal at a preselected time of day;

tune storage means for storing information indicative of the frequency and duration of each of a desired series of musical notes, said tune storage means providing a series of note frequency and duration signals in response to the generation of an alarm signal by said alarm time sensing means;

input means for altering the information stored in said tune storage means in response to an operator initiated input;

a frequency generator for generating a high frequency time standard signal;

divider means for producing a multiplicity of frequency from said high frequency time standard signal;

means for selecting a desired frequency produced by said divider means corresponding to each desired musical note and responsive to its associated note frequency and duration signal produced by said tune storage means;

means for enabling said means for selecting for a time duration for each desired note responsive to its associated note frequency and duration signal; and

an audio generator for generating an audible musical note upon application of each desired frequency generated by said divider means for a time duration determined by said means for enabling;

wherein time storage means includes:

an M×N line matrix array means, said M lines corresponding in number and interconnected with the outputs of said divider means, said N lines corresponding in number to the number of note frequency and duration signals to be produced and thus to the notes of a desired molody to be generated, said M×N line matrix array means decoding said digital timing count into sequentially produced duration signals generated on said N lines and corresponding to the duration of said notes: and

K×L line matrix array means, said L line corresponding in number and interconnected with said N lines of said M×N line matrix array, said K lines corresponding to individual scale notes, said K×L line matrix array means coding note frequency information into said duration signals to form the note frequency and duration signals;

said M×N line matrix array means decoding more than one count of said digital timing count into a single duration signal on a signal N matrix line.

4,421,423

WATERTIGHT WRIST-WATCH CASING

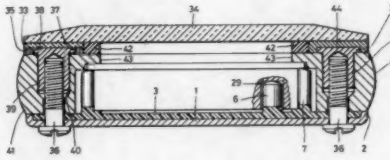
Marc Lederrey, Le Landeron, Switzerland, assignor to Montres Rado S.A., Switzerland

Filed May 4, 1982, Ser. No. 374,690

Claims priority, application Switzerland, May 1, 1981, 2858/81

Int. Cl.³ G04B *37/08, 37/00*

U.S. Cl. 368—291 **6 Claims**



1. In a watertight wrist-watch casing including a caseband and an independent bottom removably secured to said caseband by means of screws crossing the bottom and causing a gasket of elastomeric material to be compressed between the caseband and the bottom so as to form a tight seal between these two pieces, the arrangement of a bottom comprising an outer metallic piece and a thin elastomer inner layer lining at least the peripheral part of the inner face of said outer metallic piece to which it strongly adheres by a metal/elastomer junction, said screws pressing a portion of said thin layer against the caseband lower face, wherein said metallic bottom piece has its edges bent upwards so as to come in abutting engagement with the lower caseband face, said thin inner layer having an upwardly projecting rim at its periphery being adjacent to said bent up edges of the metallic bottom piece and extending, when at rest, beyond said bent up edges, the part of said rim so extending beyond said bent up edges being flattened out by the caseband lower face down to the level of said bent up edges, when the casing is closed, the amount of said rim which extends beyond said bent up edges, when at rest, being determined so that closing the casing does not generate in said thin layer a stress exceeding its limit of elasticity.

4,421,424

INSTRUMENT AND METHOD FOR CONTROL TESTING OF VULCANIZED RUBBER

Keith Price, Rixensart, Belgium, and Michael Mathews, Swindon, England, assignors to Monsanto Europe S.A.

Filed Jan. 21, 1982, Ser. No. 341,391

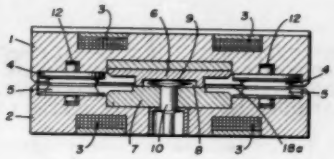
Claims priority, application United Kingdom, Jan. 29, 1981, 8102774

Int. Cl.³ G01N *3/32*

U.S. Cl. 374—48 **5 Claims**

1. Apparatus comprising a curemeter having first dies maintainable at a substantially uniform vulcanization temperature, the said first dies being arranged to be separable and for closure, and which when closed define a cavity for accommodating a sample of compounded rubber, means for subjecting the sample of compounded rubber to oscillating shear strain and means for obtaining a signal derived from such oscillation and correlating with the degree of vulcanization of the sample characterized in that the apparatus also includes other separable dies maintainable at the same substantially uniform vulcani-

...ure as the first said dies, which other separable dies ... define at least one cavity for accommodating a ... sample of the compounded rubber for vulcanization under static conditions, the apparatus further including means



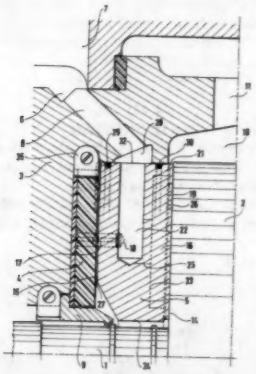
for effecting the substantially simultaneous closure of the first dies forming the cavity in which the sample of rubber is subjected to oscillating shear strain and of each set of the other dies forming a cavity in which a further sample of rubber is vulcanized under static conditions.

4,421,425

FIXED FAD THRUST BEARING

Gerard Foucher, Tremblay les Gonesse, and Michel Hermand, Le Blanc Mesnil, both of France, assignors to Alsthom-Atlantique, Paris, France

Filed May 17, 1982, Ser. No. 379,198
Claims priority, application France, May 15, 1981, 81 09706
Int. Cl.³ F16C *17/04, 27/02*
U.S. Cl. 384—123 **3 Claims**



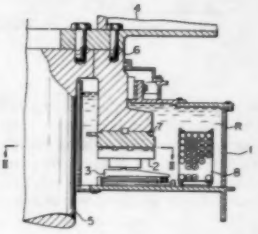
1. A fixed pad thrust bearing for a turbomachine, said turbomachine comprising a rotor, a stator surrounding said rotor, said thrust bearing comprising a thurst collar integral with said rotor, a ring having radial grooves defining fixed sector-shaped pads disposed at various points around said rotor, deformable means on which a rear surface of said ring bears at various points, said stator comprising a fixed cage containing said ring and said deformable means, oil feed means discharging into said fixed cage, and an annular oil recovery chamber, one or more passages in the lower part of said fixed cage, whence oil is evacuated by gravity, and wherein each pad is delimited by first and second lateral edges, said first lateral edge being in advance of said second lateral edge in the direction of rotation of said collar, each pad having a front surface facing said collar and an outer edge facing a wall of said cage, each pad having in its front surface an opening adjacent said first lateral edge, which is delimited by first and second inner edges, said opening terminating radially short of the inner and outer edges of the pad, and a passage in the pad receiving oil charging through an orifice in its outer edge and feeding said opening, said front surface of each pad diverging from said rear surface of said ring in the direction away from said first inner edge, said grooves extending completely across said ring, and said wall of said cage facing said orifice in said outer edge of each pad incorporating a space to which oil is fed by said oil feed means.

4,421,426

THRUST BEARING DEVICE

Yoshio Furukawa, Hitachi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 21, 1981, Ser. No. 313,502
Claims priority, application Japan, Oct. 29, 1980, 55-150738
Int. Cl.³ F16C *17/06*
U.S. Cl. 384—219 **5 Claims**



1. A thrust bearing device comprising:

a plurality of bearing shoes arranged around a rotary shaft for slidaly journaling a rotary member, said bearing shoes each being segmental in shape;

support means for resiliently supporting each of said bearing shoes for free pivotal movement; and

a bearing oil tank containing a lubricating oil and enclosing said bearing shoes and said support means; wherein the improvement resides in said support means comprising underlying pressure receiving members each formed on its upper surface with a portion for pivotally supporting the associated bearing shoe and on its undersurface with two spread-apart legs each located at one of opposite ends thereof, and resilient members each located beneath one of said pressure receiving members, one of said legs of each of said pressure receiving members being constructed to bear a lower thrust load than the other leg and each of said resilient members being located beneath the leg for bearing the lower thrust load.

4,421,427

SHORTHAND MACHINE HAVING ELECTRIC PLATEN ADVANCEMENT

Richard A. Michals, Skokie; Frank H. Mozer, Hoffman Estates, and Ralph E. Zum Bahlen, Chicago, all of Ill., assignors to Stenograph Corporation, Skokie, Ill.

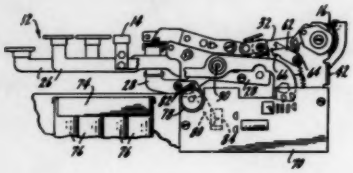
Division of Ser. No. 195,923, Oct. 10, 1980, Pat. No. 4,363,558.
This application Sep. 29, 1982, Ser. No. 426,861
Int. Cl.³ B41J *3/26, 23/34, 23/08*
U.S. Cl. 400—94 **6 Claims**

1. In a shorthand machine of the type having a set of keys wherein numerals, or words or parts of words, are generated by a stroke which comprises depressing and releasing a key or combination of keys, and a universal member mounted for engagement by the keys and movable in response to a stroke of the keys, the improvement comprising:

a. mechanical drive means for mechanically advancing the platen in response to a stroke of the keys, said mechanical drive means including clutch means mechanically coupled to the platen and movable from a rest position to an advanced position, said movement effecting rotation of the platen, said clutch means when in said rest position being

positioned in the path of movement of said universal member, whereby said clutch means may be engaged and moved by said universal member from said rest position to said advanced position to effect rotation of the platen in response to each stroke of the keys,

b. electrical drive means operable independently of said mechanical drive means for electrically advancing the platen in response to a stroke of the keys,



c. selecting means including a locking mechanism for selectively moving said clutch means from its rest position to its advanced position and holding said clutch means in its advanced position out of the path of movement of said universal member whereby said mechanical drive means may be selectively rendered inoperative.

4,421,428

THERMAL PRINTER

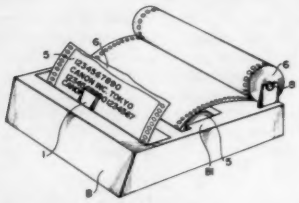
Atsushi Noda, and Takayoshi Hanakata, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 16,984, Mar. 2, 1979, abandoned. This application Nov. 14, 1980, Ser. No. 207,195

Claims priority, application Japan, Mar. 8, 1978, 53-26184; Mar. 9, 1978, 53-27048; Mar. 9, 1978, 53-27049; Mar. 9, 1978, 53-27050; Mar. 9, 1978, 53-27055; Mar. 9, 1978, 53-27056; Mar. 9, 1978, 53-27057; Apr. 14, 1978, 53-43508

Int. Cl.³ B41J *3/20, 15/20*

U.S. Cl. 400—120 **3 Claims**



1. A thermal printer comprising:

a thermal head

a first recording medium having perforations;

a second recording medium superimposed on said first recording medium and of a width less than that of said first recording medium, said second recording medium consisting of unperforated paper having a layer of heat sensitive material on its front surface and a layer of heat fusible ink on its rear surface the front surface being adjacent said thermal head;

a first shaft disposed in the immediate vicinity of an imprinting station provided by said thermal head;

sprocket roller means disposed at opposite ends of said first shaft for engaging the perforations in said first recording medium to feed it;

rubber roller means disposed on said first shaft and located intermediate said sprocket roller means for driving said first and said second recording medium simultaneously;

second shaft means for supporting a roll of said first recording medium rolled thereon; and

third shaft means for supporting a roll of said second recording medium rolled thereon, said third shaft means being disposed between said first and second shaft means.

4,421,429

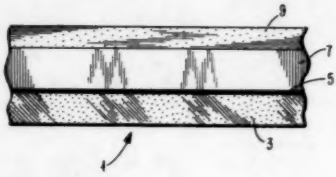
RESISTIVE SUBSTRATE FOR THERMAL PRINTING RIBBONS COMPRISING A MIXTURE OF THERMOSETTING POLYIMIDE, THERMOPLASTIC POLYIMIDE, AND CONDUCTIVE PARTICULATE MATERIAL

Arthur E. Graham, Lexington, Ky., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 22, 1981, Ser. No. 333,348

Int. Cl.³ B41J *31/00*

U.S. Cl. 400—120 **12 Claims**



1. A ribbon for non-impact thermal transfer printing comprising a thermal transfer layer and a resistive substrate which comprises a thorough mixture of a thermosetting polyimide, a thermoplastic polyimide, and an electrically significant amount of conductive, particulate material.

4,421,430

DOT PRINTER

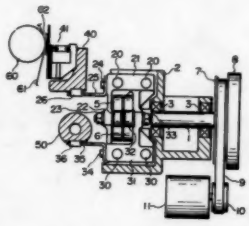
Yoshikane Matsumoto; Tsuneki Kobayashi; Makoto Kurosawa, and Minoru Seino, all of Katsuta, Japan, assignors to Hitachi Koki Company, Limited, Tokyo, Japan

Filed Apr. 12, 1982, Ser. No. 367,518

Claims priority, application Japan, Apr. 13, 1981, 56-55796

Int. Cl.³ B41J *3/10*

U.S. Cl. 400—121 **5 Claims**



1. A dot printer, comprising:

a rotatable cam shaft, and means for driving said cam shaft;

a pair of cams mounted on said cam shaft in a manner such that the major diameters thereof are orthogonal with one another;

a pair of first and second sliders reciprocable in opposite directions and perpendicularly to said cam shaft, said sliders being in contact with cam surfaces of said pair of cams and on both sides of said cam shaft;

hammer bank means including a plurality of printing hammers, and a hammer bank coupled to said first slider so that said hammer bank is reciprocated along a printing line; and

a counterweight coupled to said second slider so that said

counterweight is reciprocated in a direction opposite the direction of reciprocation of said hammer bank, said counterweight having a weight which is substantially equal to that of said hammer bank; and said hammer bank and said counterweight being coupled to said pair of sliders in a manner such that a line connecting the center of gravity of said hammer bank to the center of gravity of one of said pair of sliders and a line connecting the center of gravity of said counterweight to the center of gravity of the other slider cross another.

4,421,431

METHOD FOR DOT MATRIX PRINTING AT SELECTED UNIFORM DOT COLUMN SPACING

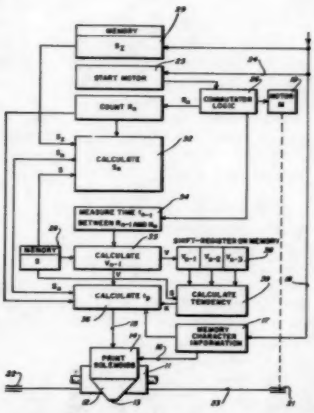
Klaus Dorrfub, Furth, and Werner Krausser, Nuremberg, both of Fed. Rep. of Germany, assignors to Triumph-Adler A.G. fur Buro- und Informationstechnik, Nuremberg, Fed. Rep. of Germany

Continuation of Ser. No. 254,123, Apr. 14, 1981, abandoned. This application Mar. 4, 1983, Ser. No. 472,204

Claims priority, application Fed. Rep. of Germany, Apr. 15, 1980, 3014338

Int. Cl.³ B41J 3/12

U.S. Cl. 400—124 **2 Claims**



1. In a dot matrix printer having a column array of print wires mounted on a movable carriage, a method for printing dot columns at selectable uniformly spaced distances, comprising the steps of

selecting a desired uniform dot column spacing,

generating control pulses at intervals representing carriage movement through a known distance greater than the distance occupied by a plurality of printed dot columns at the selected uniform dot column spacing,

determining the distances to all of the plurality of dot column printing positions possible at the selected uniform dot column spacing from a given control pulse to the next following control pulse,

measuring the time between said given control pulse and its preceding control pulse,

computing the velocity of said carriage from said known distance and measured time, and

from said predetermined distances and computed velocities calculating the times for energizing said print wires to print dot column information at the desired uniform spacing in the interval following a given control pulse.

4,421,432

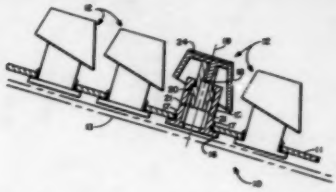
KEY SWITCH CAP MOUNTING ARRANGEMENT

M. Jeremy Lieb, Freeport, Ill., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Sep. 4, 1981, Ser. No. 299,356

Int. Cl.³ B41J 5/12

U.S. Cl. 400—492 **13 Claims**



1. Key switch actuator apparatus having a key cap mountable in either of two angular relationships relative to a supporting column comprising:

a column having an end with a cylindrical socket therein aligned with a first axis which forms a predetermined acute angle with a second longitudinal axis of said column;

a key cap having an outer surface adapted for operator contact, said outer surface generally defining a plane; and

a cylindrical post on an inner surface of said key cap configured to be snugly received in the socket and aligned with a third axis which forms an acute angle substantially equal to the predetermined acute angle with a fourth axis perpendicular to the plane defined by the outer surface of said cap, whereby said column and said key cap can be assembled in a first angular relationship in which the first and second axes coincide with the third and fourth axes respectively so that the plane defined by the outer surface of said cap is substantially perpendicular to the longitudinal axis of said column, or in a second angular relationship in which said column and said key cap are rotated 180° relative to one another about the first and third axes so that the plane defined by the outer surface of said key cap is inclined from its first angular relationship by an angle equal to twice the predetermined acute angle.

4,421,433

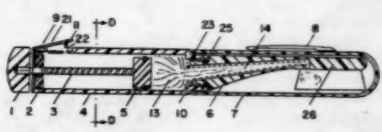
HYGIENIC TOOTHBRUSH COMPRISING A CONTAINER FOR DENTIFRICE SUBSTANCES

Gilberto M. Villanueva, Calle de Carnero No. 5384 Guadalajara, Jalisco Mexico

Filed Nov. 26, 1980, Ser. No. 210,641

Int. Cl.³ A46B 11/02

U.S. Cl. 401—175 **10 Claims**



1. A hygienic toothbrush comprising:

a hollow handle portion for storing dentifrice having a generally cylindrical interior and two open ends;

a cover for a first of said open ends, having first securing means thereon for securing said cover to said handle portion, and a first aperture therein;

a threaded bar passing through said first aperture into said interior of said handle portion and having a portion exterior thereof;

a knob rigidly secured to said exterior portion of said bar;

a plunger movably secured to said interior portion of said

bar, and having a threaded interior to complement the thread of said bar;

a vent comprising a first and a second orifice through which first and second pins extend, said first pin being larger than said second pin, and of sufficient length to contact said plunger, said second pin being of insufficient length to contact said plunger, and further comprising a rod connecting said first and second pins, said rod being flexibly secured to said handle; and

a brushing member removably secured to said handle portion by a second securing means located within said second open end of said handle portion, said brushing member comprising a brushing surface and a conduit leading from said second open end of said handle portion to said brushing surface.

4,421,434

CLAMP MEMBERS

Bengt Magner, Mellösa, Sweden, assignor to Opto-Systems Ltd., United Kingdom

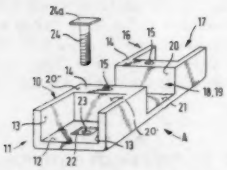
PCT No. PCT/SE80/00128, § 371 Date Jan. 17, 1981, § 102(e) Date Nov. 14, 1980, PCT Pub. No. WO80/02587, PCT Pub. Date Nov. 27, 1980

PCT Filed Apr. 30, 1980, Ser. No. 224,524

Claims priority, application Sweden, May 17, 1979, 7904328

Int. Cl.³ F16B *7/00*

U.S. Cl. 403—175 **29 Claims**



1. A clamp member being together with other equally shaped and differently shaped clamp members and with the aid of fixing means assemblable to different types of clamp assemblies for uniting at least two elongated elements such as rods or tubes with the identical cross-section, said clamp member comprising at least one first part defining a portion of a recess for engaging a non-flanged and non-slotted end portion of one elongated element, and one second part defining a portion of a through-channel for engaging any non-flanged and non-slotted portion of another elongated element disposed at right angles to the afore-mentioned elongated element, each of said first and second parts being limited by outer walls having internal and external faces, wherein said internal faces are free of projections and each of said first part recesses are inside the clamp member terminated by a transverse block spanning the whole recess portion and having one top face and two opposite side faces, one of said transverse block side faces defining an end wall face of said respective first part recess and constituting thus a dead-end-socket for the said end portion of the one said elongated element, and the second of said transverse block side faces defining a portion of a side wall face of said through-channel, said fixing means being located inside the clamp member between said first part and said second part, and arranged in the central axial region of said transverse block.

4,421,435

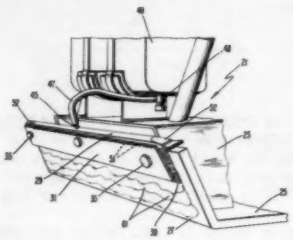
METHOD AND APPARATUS FOR APPLYING A THIN LIQUID FILM TO A VIBRATORY PLATE

Wayne P. Zemke, Port Washington; Clyde M. Maki, Hartford, and Brian J. Smith, Port Washington, all of Wis., assignors to Koehring Company, Brookfield, Wis.

Filed Mar. 17, 1981, Ser. No. 244,625

Int. Cl.³ E01C *19/38*

U.S. Cl. 404—113 **1 Claim**



1. An apparatus for applying a thin film of liquid to a vibratory plate arranged on an edge of a vibratory compactor comprising:

container means fixed to the plate for holding a liquid adjacent to the plate;

inlet means for admitting the liquid to the container means;

means for maintaining intimate contact between a thin film of the liquid and a front surface of the vibratory plate over substantially an entire width of the plate as the thin film moves downwardly under the influence of gravity, said means for maintaining intimate contact being arranged within the container means, the means for maintaining intimate contact comprising a serrated rubber mat arranged adjacent the surface of the plate and open cell urethane foam rubber arranged within the container means at an edge of the serrated rubber mat adjacent to both the plate and the outlet means; and

outlet means arranged along substantially the entire width of the plate for permitting a low velocity laminar flow of a thin liquid film to emanate from the container means along the surface of the plate in the form of a liquid sheet which remains in contact with the plate surface due primarily to surface tension as the sheet moves downwardly.

4,421,436

TENSION LEG PLATFORM SYSTEM

Robert B. Burns, Huntington, N.Y., assignor to Texaco Development Corporation, White Plains, N.Y.

Filed Jul. 6, 1982, Ser. No. 395,385

Int. Cl.³ E02B *15/04*

U.S. Cl. 405—60 **12 Claims**

1. A tension leg platform system for use in an offshore body of water to drill wellbores into the ocean floor, and for confining an uncontrolled flow of effluent issuing from an opening at the ocean floor, and which system includes;

a semi-submersible marine vessel holding wellbore drilling equipment,

a plurality of positioning anchors resting on the ocean floor and disposed about said opening,

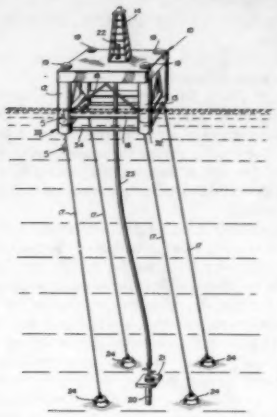
cable means extending between said semi-submersible marine vessel and said respective positioning anchors, and being adjustable to vary the cable tension whereby to draw the said vessel to a predetermined water depth,

a submergible hull defining a vertical passage therethrough and being adapted to operably engage the respective cable means,

a canopy removably positioned on said submergible hull to form a substantial closure across said vertical passage,

whereby said submersible hull can be guidably pulled down

along said respective cable means, and located above said opening which is emitting the uncontrolled effluent flow to



thereby receive said effluent flow within said canopy forming said enclosure.

4,421,437

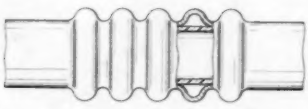
CORRUGATED BUCKLE ARRESTOR

Carl G. Langner, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 970,849, Dec. 19, 1978, abandoned, which is a continuation of Ser. No. 848,847, Nov. 7, 1977. This application Jun. 25, 1980, Ser. No. 162,719

Int. Cl.³ F16L *1/00*

U.S. Cl. 405—166 **9 Claims**



1. An underwater pipeline which is resistant to collapse via a propagating buckle comprising essentially uniform cylindrical pipe having integral corrugated section means along the length of the pipeline at predetermined intervals, the corrugated section means being substantially more resistant to collapse than the pipe and functionable to arrest or prevent a propagating buckle.

4,421,438

SLIDING LEG TOWER

Barry J. Abbott, Concord, and William H. Silcox, San Francisco, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Feb. 17, 1981, Ser. No. 235,274

Int. Cl.³ E02B *17/00*

U.S. Cl. 405—227 **7 Claims**

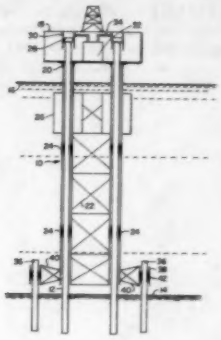
1. An offshore drilling and producing structure, which comprises:

a rigid platform;

a plurality of open-ended sleeves affixed to the platform and extending downwardly therefrom for a substantial distance below the water surface, in a substantially vertical orientation;

an equal plurality of axial piles secured to the sea floor which extends upwardly into said open-ended sleeves to at least a position near the surface of the water;

buoyant means affixed to said sleeves below the water line for supporting most of the platform weight and for providing righting stability; and



means for supporting the remaining platform weight from the plurality of axial piles said means permitting simultaneous vertical movement of each of said sleeves with respect to each of said piles to permit a desired degree of compliancy of rotation about the sea floor.

4,421,439

SUPPORTING FABRIC FOR BEARING BULK MATERIAL AND A METHOD OF BUILDING A ROAD, DIKE OR DAM EMBANKMENT

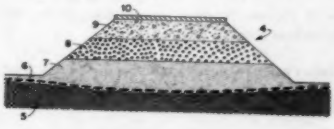
Antonius W. M. ter Burg, and Gerrit den Hoedt, both of Arnhem, Netherlands, assignors to Akzona Incorporated, Asheville, N.C.

Filed Aug. 25, 1980, Ser. No. 180,785

Claims priority, application Netherlands, Sep. 3, 1979, 7906585

Int. Cl.³ E02D *5/00*

U.S. Cl. 405—258 **17 Claims**



1. A supporting fabric having a width of at least 30 cm, and containing warp and weft yarns of a synthetic material, for bearing one or more layers of sand, gravel, stones, clay, loam or similar bulk or other material to a height of at least 10 cm, wherein the yarns extending in the warp direction of the fabric consist of straight warp yarns having a tensile strength of at least 0.2 kN and binder warp yarns, said straight warp yarns each having a higher strength than and at least five times the linear density of said binder warp yarns, the construction being such that when the fabric is subjected to a tensile load in the warp direction, the straight warp yarns bear a higher proportion of the tensile load than the binder warp yarns.

4,421,440

PROCESS AND APPARATUS FOR APPLYING PILE PLANKING

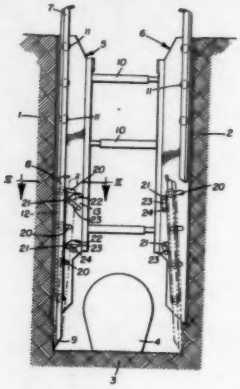
Joseph G. B. Scheepers, Maastricht, Netherlands, assignor to Maascom B.V., Maastricht and Laura Metaal B.V., Eygelshoven, both of, Netherlands

Filed May 6, 1981, Ser. No. 260,184

Claims priority, application Netherlands, May 14, 1980, 8002788; European Pat. Off., Mar. 31, 1981, 81200359.8

Int. Cl.³ E02D *17/04*

U.S. Cl. 405—282 13 Claims



2. An apparatus for lining an excavation comprising:

at least two substantially vertical guide means erected alongside and spaced apart from one another on an excavation wall;

two pile planking elements, with one element placed substantially vertically on top of the other in a common plane, said two elements being inserted between two adjacent guide means;

a common guide for guiding the two planking elements; and

a supporting means on which said common guide is mounted for supporting the lower pile planking element, wherein at least the upper portion of said supporting means being displaceably mounted onto the guide means so that the upper portion of the lower pile planking element is movable away from the excavation wall.

4,421,441

CYCLIC DRILLING MACHINE

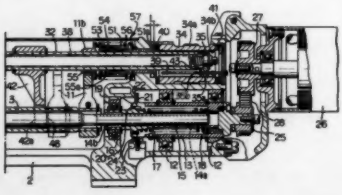
Noboru Hirose, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Oct. 23, 1981, Ser. No. 314,475

Claims priority, application Japan, Oct. 29, 1980, 55-151644

Int. Cl.³ B23B *47/34*

U.S. Cl. 408—17 6 Claims



1. A drilling machine comprising:

a frame;

a quill reciprocably mounted in the frame;

a spindle rotatably mounted in the quill and having a tool at one end thereof;

a motor operatively connected with the spindle for rotating the same;

pneumatic feed means for reciprocating the quill in forward and backward directions;

feed control means for controlling feed speed of the quill, including a rod member which is regulated of its forward movement speed at a predetermined value by regulating means and biasing means for always biasing said rod in backward direction, and engaging means for engaging the quill with the rod member in the course of forward movement thereof;

a slidable member movably disposed within a predetermined distance in movement direction of the rod member;

coupling means for coupling the slidable member to the rod member to move the slidable member with the rod member by the predetermined distance when the rod member moves in forward direction of the quill and thereafter for permitting the rod member to forwardly move relatively to the slide member, said coupling means having means to couple said slidable member to the rod member to move the former with the latter by the predetermined distance when the rod member moves in backward direction by the biasing means and then to stop backward movement of the rod member; and

operation control means for controlling the pneumatic feed means to make the quill repeat a drilling cycle wherein the quill once returns on the way of drilling operation and advances again for resuming the drilling operation.

4,421,442

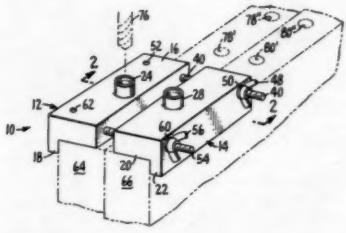
DOWELING JIG

Cyril M. Lindblad, 1533 East Ave., Napa, Calif. 94558

Filed Nov. 9, 1981, Ser. No. 319,469

Int. Cl.³ B23B *47/28, 45/14*

U.S. Cl. 408—115 R 3 Claims



1. A doweling jig, comprising:

a first jaw assembly comprising a first work clamping face and a first drill guide the axis of which is fixedly positioned at a predetermined distance from said first work clamping face;

a second jaw assembly comprising a second work clamping face and a second drill guide the axis of which is fixedly positioned at a predetermined distance from said second work clamping face; and

screw means associated with said jaw assemblies for maintaining said first and second work clamping faces substantially parallel to each other and maintaining said drill guide axes between said work clamping faces and substantially parallel to said work clamping faces, and for drawing said work clamping faces together so as to clamp together in side-by-side relation two work pieces which are to be joined by a dowel joint, whereby holes drilled by a bit passing through said drill guides when said work pieces are thus clamped in side-by-side relation are aligned

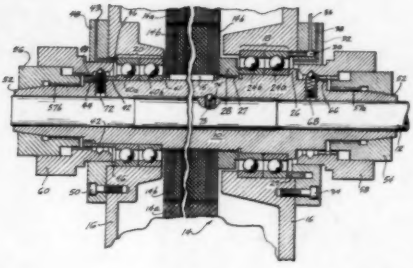
axially for receiving a dowel when said work pieces are abutted edge-to-edge.

4,421,443

HIGH SPEED MACHINE TOOL SPINDLE ASSEMBLY

Robert T. Woythal, West Allis, and Philip J. Finet, Milwaukee, both of Wis., assignors to Kearney & Trecker Corporation, West Allis, Wis.

Filed Oct. 29, 1981, Ser. No. 316,212
Int. Cl.³ B23C *9/00*; B23Q *1/08*
U.S. Cl. 409—232 **8 Claims**



1. A high speed machine tool spindle assembly for firmly retaining a cutting tool therein notwithstanding machine tool vibration comprising:

a spindle having an axially extending bore therethrough and having a first and second set of tool gripping collets extending from a first and second spindle end, respectively;

first and second collet nuts each in threaded engagement with said spindle adjacent to a separate one of said first and said second collets, respectively, for urging a separate one of said first and said second collets, respectively, radially inward against the shank of a cutting tool disposed within the bore of said spindle;

first and second collet nut driver means each carried on said spindle adjacent to a separate one of said first and second collet nuts, respectively, each of said first and second collet nut driver means being slidable along the axis of said spindle from a first position to second position to jointly engage a separate one of said first and said second collet nuts, respectively, and said spindle; and

first and second retention means each threaded into said spindle adjacent to a separate one of said first and second spindle ends, respectively, and extending radially therefrom to engage a separate one of said first and second collet nut driver means when said respective one of said first and second collet nut driver means is slid along the axis of said spindle from said first to said second position.

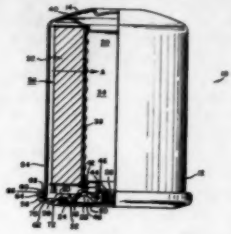
4,421,444

METHOD OF ATTACHING CLOSURE MEMBER TO FILTER HOUSING

William Hanley, Pawtucket, R.I., assignor to Fram Corporation, East Providence, R.I.

Division of Ser. No. 156,882, Jun. 5, 1980, Pat. No. 4,314,903. This application Oct. 28, 1981, Ser. No. 315,764
Int. Cl.³ B21D *51/00*
U.S. Cl. 413—4 **3 Claims**

1. The method of making an oil filter housing comprising the steps of providing a cup-shaped housing member having a side wall defining an open end, said open end having a marginal edge defining the opening into said cup-shaped member, forming a bead at the marginal edge of said cup-shaped member, providing a closure member for the open end of said cup-shaped member, said closure member defining a marginal edge, the marginal edge of said closure member being of substantially the same thickness at the rest of said closure member, the thickness of said closure member being substantially greater than the thickness of said side wall of the cup-shaped member, bending said marginal edge into an annular rim, forming an annular bead-receiving cavity in said rim, installing the bead on the marginal edge of said cup-shaped member into said cavity,



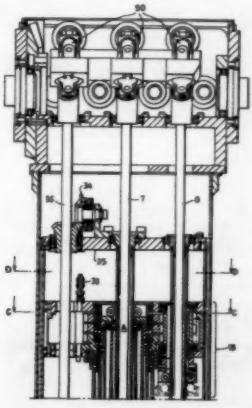
bending said rim into permanent engagement with said bead while maintaining the thickness of said rim of said closure member substantially equal to the thickness of the rest of the closure member and substantially greater than the thickness of said side wall.

4,421,445

OPERATING ARM FOR A MANIPULATOR WITH LENGTH ADJUSTMENT BY TELESCOPING MEANS

Georg Böhme, Weingarten; Wolfgang Köhler, Karlsruhe, and Manfred Salaske, Eggenstein, all of Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe G.m.b.H., Karlsruhe, Fed. Rep. of Germany

Filed Dec. 21, 1981, Ser. No. 332,447
Claims priority, application Fed. Rep. of Germany, Dec. 31, 1980, 3049577
Int. Cl.³ B25J *3/00*
U.S. Cl. 414—4 **7 Claims**



1. An operating arm for a manipulator with length adjustment by telescoping means having an inner structure including a number of concentric tubes for transmitting the various functions of the operating arm, said concentric tubes being rotatably supported at their upper ends by antifriction bearings which are supported coaxially and on top of each other within a transmission carriage which itself is slidably disposed in an outer tube of an upper portion of the telescoping means, and which has roller housings rotatably supported thereon and

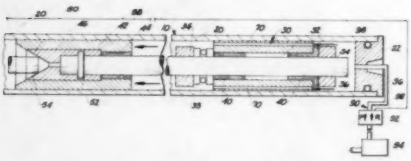
drive shafts disposed outside the center of the carriage and slidably extending through the roller housing but being operatively associated therewith so as to transmit their rotation to said roller housings while sliding therein, said roller housings having spur gear structures associated therewith, and said concentric tubes having spur gear structures at their upper ends in engagement with the spur gear structures of the respective drive shafts for rotating said concentric tubes, said transmission carriage consisting of a housing with top and bottom covers, the upper side of said top cover having one end of a chain connected thereto, said chain extending over a driven sprocket which is mounted on an intermediate support sheet arranged above the transmission carriage in the outer telescopic tube and operatively connected to an additional drive shaft disposed in the outer telescopic tube to permit upward and downward movement of the transmission carriage, said transmission carriage having a recess formed at its circumference and a counterweight slidably supported in the outer telescopic tube by means of a rail extending in axial direction through said recess and guiding said counterweight during movement thereof counter to the movement of said carriage, said counterweight being engaged with said rail by rollers and being connected to the other end of said chain.

4,421,446

BAR FEED MECHANISM

Theodoor P. C. Leon, and Joseph F. Berns, Jr., both of Cincinnati, Ohio, assignors to Manurhin Automatic Division of Mitac, Inc., Cincinnati, Ohio

Filed Jul. 23, 1981, Ser. No. 286,363
Int. Cl.³ B23B *13/10*
U.S. Cl. 414—17 **17 Claims**



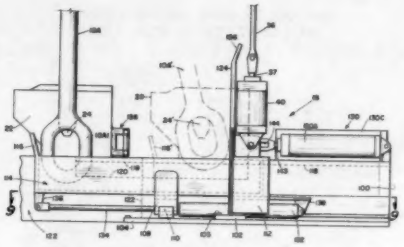
1. A bar feed mechanism for a machine tool, comprising a cylindrical tube, a piston movable axially within said tube, a shaft rotatably secured to said piston and projecting therefrom toward said machine tool, a centering sleeve rotatably mounted on said shaft and axially movable thereon, center means secured to said shaft at the end thereof remote from said piston, said center means having a concave surface for engaging the trailing end of a bar, a bushing at the end of said tube adjacent said machine tool, said bushing having an orifice which permits passage of said center means therethrough but retains said centering sleeve, a pressure inlet for admitting pressure fluid behind said piston to cause movement thereof in a feeding direction, said inlet being connected to a source of hydraulic pressure, means to admit hydraulic pressure fluid between said piston and said centering sleeve, said centering sleeve being axially movable on said shaft at all times between said piston and said center means, and pressure relief means to permit discharge of pressure fluid from said tube between said piston and centering sleeve when said sleeve abuts said bushing whereby to permit continued movement of said piston, shaft and center means in said feeding direction.

4,421,447

ELEVATOR TRANSFER AND SUPPORT SYSTEM

Howard S. Gudgel, and William E. Guier, both of Tulsa, Okla., assignors to Zena Equipment, Inc., Tulsa, Okla.

Filed Mar. 9, 1981, Ser. No. 241,508
Int. Cl.³ E21B *19/06*
U.S. Cl. 414—22 **14 Claims**



1. In a rotary drilling apparatus having a rotary table, a link control means attached to the links of a lifting means such as a travelling block, the travelling block being supported from a crown block in the tower of the drilling apparatus, the link control means serving to control the lateral position of two bales or links hanging from the travelling block, and two substantially identical elevators, each adapted to be carried separately by said bales, the improvement providing setback platform means to support the two elevators in two working positions, and to facilitate the engagement or disengagement of said links to or from each of the elevators comprising:

a cylindrical stool having a sidewall and having a vertical, axial opening therethrough for receiving drill pipe, the stool being supported on and rotatably attached to the rotary table;

a frame means adapted to be supported in a selected position in close proximity to the rotary table of the drilling apparatus;

a pair of parallel troughs supported from said setback platform means and spaced apart so as to straddle and extend along the opposite sides of said rotary table, said troughs being dimensioned to receive the bottom ends of said two links therein when said links are spread apart and are lowered, the troughs providing guiding force both inwardly and outwardly with respect to said stool to properly position said links to engage said elevators;

said setback platform means having a horizontal deck at the same height as the top of said stool, when positioned on top of said rotary table, said deck and said stool having a colinear longitudinal groove or keyway cut into said deck and the top of said stool, adapted to receive a corresponding key on the bottom of each of said elevators;

means attached to said setback platform means to move an elevator from a first position over said stool; to a setback second position on said deck, and vice versa; and,

including means to traverse said troughs longitudinally along said frame.

4,421,448

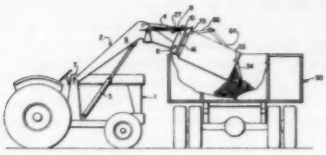
SELF-DUMPING BIN

Berthold Sonnenberg, R.R. #3, Waterford, Ontario, Canada (N0E 1Y0)

Filed Mar. 3, 1981, Ser. No. 240,056
Claims priority, application Canada, Mar. 14, 1960, 347667
Int. Cl.³ B65G *65/66*
U.S. Cl. 414—411 **9 Claims**

1. A self-dumping produce bin adapted to be transported on a fork pivotally mounted on the free ends of a pair of tractor mounted arms movable between raised and lowered positions, the fork being mounted to permit a bin carried by it to be

mo[illegible] between a produce bin lifting position, a produce bin tra[illegible]ing position and a produce bin dumping position, a door on the side of the bin which door is self closing when the bin is moved from its produce dumping position to its produce transporting position, a horizontal shaft extending between the sides of the bin, the bin door being pivotable about said shaft; a bin door opening mechanism mounted on the bin, the opening mechanism having two pairs of links, one pair being located adjacent each side of the bin, the two links forming each pair being pivotably interconnected at adjacent ends, the free end of one link of each pair of being pivotably connected to the



bin door adjacent the upper edge of the bin door, a rotatable shaft secured between the walls of the bin adjacent the upper edge of the bin opposite, and parallel to, the bin door, the free end of the other link of each pair being fixed to said rotatable shaft a gravity operated door tripping mechanism mounted on said one of said tractor mounted arms, the tripping mechanism being arranged to engage means fixed to said rotatable shaft to engage with said door tripping mechanism to rotate said shaft to shorten the distance between the free ends of each pair of arms to thereby positively pivotably open the bin door when said produce bin is moved from a produce transporting position to a produce dumping position.

4,421,449

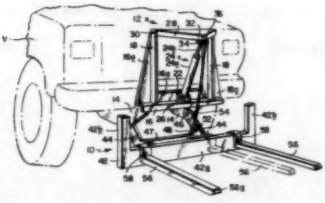
VEHICLE LIFT ATTACHMENT

Vernon Cotton, Pond St., Groveland, Mass. 01834

Filed Oct. 27, 1981, Ser. No. 315,511

Int. Cl.³ E01H *5/06*; B66F *9/00*

U.S. Cl. 414—685 **4 Claims**



1. A lift attachment for a vehicle comprising

A. a snow plow lift mounted to the front of the vehicle;

B. a rigid cross frame member;

C. a pair of tongues, said tongues having

(1) one end attached to the cross frame member at laterally spaced-apart locations thereon, and

(2) an opposite end arranged to be pivotally connected to the vehicle chassis;

D. a plurality of tines, said tines each having one end provided with a bracket to enable the tine to be engaged on the cross frame member so the tine projects forwardly of that member, and

E. means connected between the cross frame member and the snowplow lift enabling the lift to swing the cross frame member from a lower position adjacent the ground to an elevated position above the ground.

4,421,450

CARGO HANDLING APPARATUS

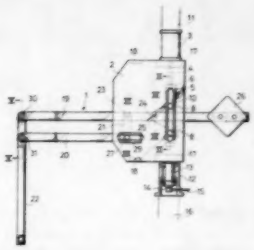
Toshio Kouno, c/o Dainichikiko Kabushikikaisha 774 Nakano, Ebina-shi, Kanagawa-ken, Japan

Continuation of Ser. No. 903,828, May 8, 1978, abandoned. This application Feb. 24, 1982, Ser. No. 351,971

Claims priority, application Japan, May 13, 1977, 52-55713; Aug. 3, 1977, 52-93162; Aug. 30, 1977, 52-104462

Int. Cl.³ B66F *11/00*

U.S. Cl. 414—719 **7 Claims**



1. A load handling apparatus comprising a lift structure adapted to be moved along a vertical axis, a pair of parallel supporting side plates disposed about said lift structure to rotate in fixed position around said vertical axis, a first horizontal arm extending through a space defined between said supporting side plates, said first horizontal arm being pivotally connected to said lift structure and having one end portion provided with a counterweight and the other end portion pivotally connected to a vertically extending arm, a second horizontal arm extending below and in parallel with said first horizontal arm and having one end portion pivotally connected to said vertical arm, a vertical link arranged between the lift structure and the vertical arm for pivotally connecting said first and second horizontal arms so as to define a parallelogram together with said vertical arm, first guide means provided at the pivotal connection between said vertical link and said second horizontal arm, said first guide means being adapted to be slidably received in a vertical slot formed in each of said supporting side plates and extending perpendicularly to said horizontal slots, actuator means for moving said lift structure in response to a load on said vertical arm to maintain said first and second horizontal arms and said vertical arm and vertical link in parallel relationship during movement with the load and counterweight balanced, comprising a fluid actuated piston and cylinder, a source of fluid under pressure and a fluid circuit for operating said actuating means, said fluid circuit comprising a pilot regulator having a primary flow path for feeding said fluid to said cylinder and a secondary flow path for exhausting said fluid from said cylinder, each path having a manually operable valve and a throttle valve for regulating the velocity of the fluid, at least said primary flow path having a check valve preventing flow of fluid back to said source, said manually operable valves being actuable to maintain the pressure of fluid in the primary and secondary paths equal to the pressure of the fluid in the cylinder.

4,421,451

WORKPIECE GRIPPING MECHANISM FOR INDUSTRIAL ROBOTS

Bobby L. Higgins, Dallas, Tex., assignor to Thermwood Corporation, Dale, Ind.

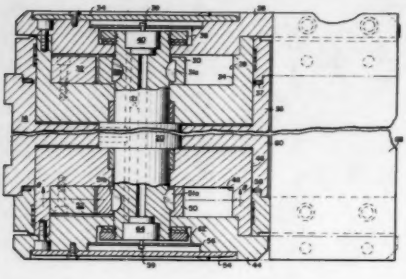
Filed Mar. 23, 1982, Ser. No. 361,858

Int. Cl.³ B66C *1/42*

U.S. Cl. 414—739 **16 Claims**

9. A workpiece gripping mechanism for an industrial robot comprising a support member, a shaft rigidly mounted on said support member, first and second jaw assemblies pivotally

mounted on said shaft, each of said jaw assemblies having an annular chamber disposed concentrically relative to said shaft, each of said chambers having a partition element rigidly mounted on said jaw assembly and disposed in sealing engagement with said shaft, and a vane element rigidly mounted on said shaft and disposed in sealing engagement with said jaw assembly, defining a fluid-actuated motor operable for pivoting said jaw assembly relative to said shaft.



4,421,452

STATION FOR COLLECTING WIND ENERGY

Raoul Rougemont, Basse Bergerie, Francueil, F-37150 Blere, France

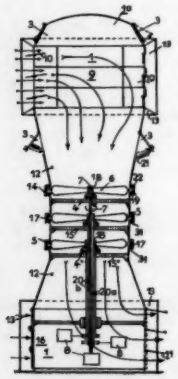
PCT No. PCT/FR80/00141, § 371 Date May 28, 1981, § 102(e) Date May 28, 1981, PCT Pub. No. WO81/00887, PCT Pub. Date Apr. 2, 1981

PCT Filed Sep. 26, 1980, Ser. No. 268,992

Claims priority, application France, Sep. 28, 1979, 79 24285; Jun. 4, 1980, 80 12382

Int. Cl.³ F03D *7/04*

U.S. Cl. 415—4 **12 Claims**



1. A fixed station for wind energy conversion, regardless of wind direction, comprising:

wall means providing an upright tubular column that is fixed in regard to translation, rotation and tilt, said column having means providing an upper inlet, a lower outlet and a transmission conduit extending between the inlet and the outlet;

a plurality of inlet valve means angularly distributed about the periphery of the column inlet, each such inlet valve being constructed and arranged to admit wind impacting the column exterior to enter the column, but prevent wind which has entered the column from exiting the column, so that the wind which enters the column is directed to the transmission conduit;

a wind energy conversion system comprising: a plurality of shafts coaxially journalled for independent rotation in said column; each shaft having a wind energy conversion device mounted thereon which, when impacted by the wind is caused to turn, thus rotating the corresponding shaft; and rotary-power take-off means operatively connected to said shafts;

said wind energy conversion devices being located in said transmission conduit;

a plurality of outlet valve means angularly distributed about the periphery of the column outlet, each such outlet valve being constructed and arranged to exhaust wind impacting it from the column interior, and to prevent wind impacting the column exterior from entering the column;

a plurality of normally-biased-closed safety-valve means provided in the column wall means, for dumping excess wind pressure from the transmission conduit to prevent the impact of excessive wind pressure on the wind energy conversion devices;

auxiliary power means operatively connected with at least one of the wind energy conversion devices for overcoming inertia and thus initiating rotation of the respective wind energy conversion devices should the impacting wind be insufficiently strong to do so;

flywheel means journalled for rotation on the column; and

clutch means for selectively engaging the flywheel means with the wind energy conversion system for storing the effect of wind power above a predetermined threshold power, and for utilizing the stored excess power to rotate said shafts when said shafts would otherwise rotate more slowly.

4,421,453

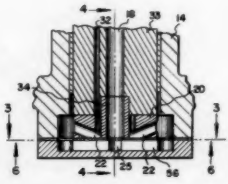
CENTRIFUGAL OIL PUMP

Herbert L. Hoff, Holmen, and Daniel C. Leaver, La Crosse, both of Wis., assignors to The Trane Company, La Crosse, Wis.

Filed Feb. 18, 1982, Ser. No. 349,798

Int. Cl.³ F04B *39/02*

U.S. Cl. 415—88 **12 Claims**

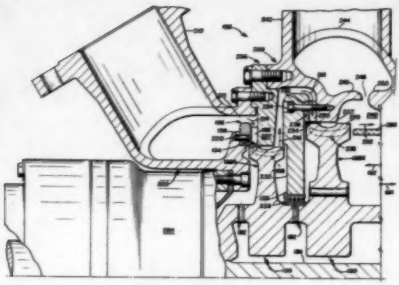


7. A centrifugal pump impeller comprising a body having a generally cylindrical section for operating in a sump to capture and propel fluid outwardly from said body, said section having a substantially flat bottom surface with a plurality of discrete fluid scooping inlet openings therein, and an outlet opening disposed in the perimeter of said body for each of said inlet openings; and a tunnel extending angularly upward and radially outward from each of said inlet openings to an outlet opening, with the regions of said body remaining between adjacent tunnels having substantially triangular configurations along the plane of said substantially flat bottom surface, and functioning as vanes between said inlet openings.

4,421,454
TURBINES

Leon R. Wosika, El Paso, Tex., assignor to Solar Turbines Incorporated, San Diego, Calif.

Division of Ser. No. 79,584, Sep. 27, 1979, abandoned. This application Dec. 15, 1980, Ser. No. 216,778
Int. Cl.³ F10D 1/02
U.S. Cl. 415—117 13 Claims

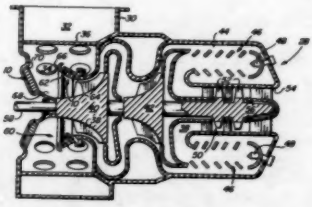


11. A dual pressure turbine comprising: a high pressure section having at least one radial impulse turbine stage; a low pressure section having at least one axial flow stage; means for introducing a working fluid at one pressure into said high pressure section; means for introducing working fluid at a second, lower pressure into said low pressure section; and means for mixing working fluid exhausted from the high pressure section with the lower pressure working fluid prior to introducing the working fluid into the low pressure turbine section, said last-mentioned means comprising: an annular exhaust plenum on the downstream side of the high pressure section, said exhaust plenum having an annular outlet communicating with the low pressure section of the turbine; an annular, working fluid inlet manifold surrounding said exhaust plenum; an annular flow passage between said inlet manifold and said exhaust plenum; and means through which working fluid can be introduced into said inlet manifold at said lower second pressure.

4,421,455
DUCT LINING

Raymond H. Tomren, Scottsdale, Ariz., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Dec. 22, 1981, Ser. No. 333,491
Int. Cl.³ F01N 1/02; F03B 11/00; F04D 29/66; B32B 3/12
U.S. Cl. 415—119 39 Claims



1. A noise attenuating duct lining comprising:
a first lamina of relatively nonrigid air-permeable filamentary cloth which is substantially liquid impermeable at atmospheric pressure;
a second lamina of relatively rigid perforate material secured to said first lamina to support the latter, said second lumina being fluid-permeable;
a third lamina of means for defining a multitude of cells opening to said second lamina, said second lamina being secured to said third lamina and arranged to span the openings of said cells of said third lamina.

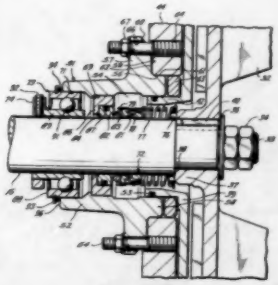
34. The method of making a noise attenuating duct lining comprising the steps of:
providing a first layer of air-permeable wire cloth, said wire cloth defining a pair of opposite faces, one of said opposite faces of said wire cloth being substantially smooth and impermeable to liquid at atmospheric pressure;
providing a second layer of perforate metal sheet adjacent the other face of said wire cloth, said perforate sheet defining a multitude of spaced perforations communicating therethrough;
electron diffusion bonding said first layer to and said second layer,
providing a third layer of honeycomb structure, said honeycomb structure defining a multitude of cells extending therethrough, said multitude of cells opening at one end thereof to said perforate sheet;
providing a fourth layer of imperforate sheet closing the other ends of said multitude of cells; and
adhesive by bonding said second and said fourth layers to said third layer of honeycomb structure to seal said multitude of cells from direct communication with one another.

36. Noise attenuating apparatus particularly for turbo machinery, said noise attenuating apparatus comprising a first layer of noise attenuating material said first layer communicating with a noise-containing environment associated with said turbo machinery; and a second layer of air-permeable and accoustically conductive fibrous cloth interposed between said first layer and said noise-containing environment, said fibrous cloth being substantially impervious to a liquid at atmospheric pressure from the group composed essentially of water, turbo machinery lubricating oils, turbo engine fuel oils, and combinations thereof, said second layer of fibrous cloth transmitting noise from said noise-filled environment to said first layer while substantially preventing transmission of said liquids thereto.

4,421,456
CENTRIFUGAL PUMP ASSEMBLY

Robert R. Huffman, Houston, Tex., assignor to C T Manufacturing, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 357,993, Mar. 15, 1982. This application Jul. 26, 1982, Ser. No. 401,659
Int. Cl.³ F01D 1/00
U.S. Cl. 415—170 A 10 Claims



1. In a centrifugal pump of the end suction type and having casing means defining an annular chamber, a rotatable pump shaft in the chamber and aligned with the fluid inlet, an impeller mounted by a threaded nut at the end of the pump shaft within the chamber and a shaft mounting structure including a pedestal cover secured to the casing, the improvement comprising:

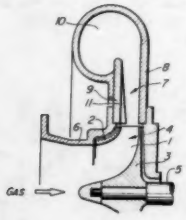
(a) said cover having a central opening providing an annulus located concentrically with said shaft;
(b) a removable bearing and seal carrying stuffing box seated by stepped surfaces in said central opening and releasably secured to said pedestal cover;
(c) said box having a cylindrical passageway concentric with the rotational axis of said shaft and said passageway having outwardly and inwardly facing step surfaces;
(d) a mechanical sealing member mounted against said inwardly facing step surface about said shaft within said cylindrical passageway of said box;
(e) an antifriction bearing mounted against said outwardly facing step surface on said shaft and having an external cylindrical surface adapted to seat within said outwardly facing step surface within said cylindrical passageway of said box thereby restraining lateral shaft deflections; and
(f) locking means for securing said bearing in fixed operative position on to said shaft;
whereby said box can be released from said cover and moved axially along said shaft to facilitate removal and replacement of said bearing and said mechanical sealing member.

4,421,457

DIFFUSER OF CENTRIFUGAL FLUID MACHINE

Yoichi Yoshinaga, Minorimachi; Hiromi Kobayashi, Shimoinayoshi; Shinjiro Ueda, Kashiwa; Yoshihiro Takada, Dejimamura, and Hideo Nishida, Shimoinayoshi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 6, 1981, Ser. No. 232,007
Claims priority, application Japan, Feb. 8, 1980, 55-13718
Int. Cl.³ F04D *29/30*
U.S. Cl. 415—211 **16 Claims**



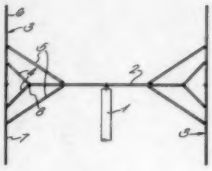
1. A diffuser of a centrifugal fluid machine having an inlet and an outlet and comprising a pair of opposed diffuser plates, and a fluid channel defined between said pair of opposed diffuser plates, such diffuser being characterized by further comprising a plurality of guide vanes formed on at least one of said diffuser plates extending along the flow of a fluid in said fluid channel, said guide vanes each having a height smaller than one-half the width of said fluid channel and gradually decreasing in going from the inlet of the diffuser toward the outlet thereof, whereby a distorted flow at the inlet of the diffuser will be brought into a substantially uniform flow pattern in an inlet portion of the diffuser and generation of secondary flow in an outlet portion of the diffuser will be avoided, by said guide vanes.

4,421,458

WIND POWERED TURBINE

John Allan, Bembridge, and Peter J. Musgrove, Reading, both of England, assignors to Sir Robert McAlpine & Sons (Trade Investments) Limited, London, England

Filed Oct. 6, 1981, Ser. No. 309,105
Claims priority, application United Kingdom, Oct. 7, 1980, 8032238
Int. Cl.³ F03D *7/06*
U.S. Cl. 416—117 **12 Claims**



1. A wind powered turbine comprising:
a supporting member,
a rotor member rotatable on the supporting member about a vertical rotation axis,
a plurality of rotor blades carried by the rotor member at positions spaced around and equidistant from the rotation axis, each blade comprising two half blade portions of aerofoil section, each half blade portion defining the total width of the rotor blade, and means at or adjacent a central region of each half blade portion mounting each half blade portion for pivotal movement as a whole relative to the other half blade portion,
and reefing means capable of pivoting the half blade portions in opposite directions so as to move them from a position parallel to the rotation axis to a position at which they form an angle to the rotation axis while remaining in the plane defined by the axis of rotation and the rotor member.

4,421,459

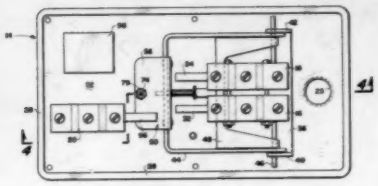
FLUID LEVEL CONTROL APPARATUS

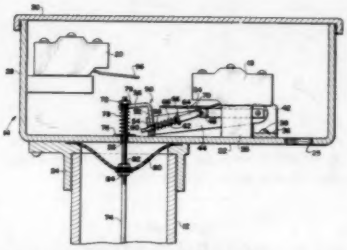
Ernest Frey, 314 S. 45th W. Ave., Sand Springs, Okla. 74127

Filed Sep. 11, 1981, Ser. No. 301,427
Int. Cl.³ F04B *49/00*
U.S. Cl. 417—38 **12 Claims**

1. Fluid level control apparatus for a fluid reservoir and comprising switching means, calibrated weight means operably connected with the switching means and suspended within the fluid reservoir, pressure sensing means interposed between the weight means and the switching means and responsive to the effective weight variances of the weight means resulting from fluid level differentials for activation of the switching means for selective actuation of a fluid input source and a discharge pump means for alternately stopping the flow of fluid to the reservoir and simultaneously discharging fluid therefrom and initiating the addition of fluid to the reservoir depending upon the fluid level within the reservoir, wherein the switching means comprises a pair of associated micro switches, first pivotal lever means disposed in the proximity of the associated micro switches, second pivotal lever means secured inboard of the first pivotal lever means and engageable with the associated micro switches for actuation thereof, bracket means connected between the first pivotal lever means and the pressure sensing means for pivoting of the first pivotal lever means in response to fluid level fluctuations, and con-

necting means secured between the first and second pivotal lever means whereby pivoting of the first pivotal lever means





transmits pivoting to the second pivotal lever means for actuation of the associated switches.

4,421,460

METHOD OF OPERATING A MOTOR COMPRESSOR UNIT

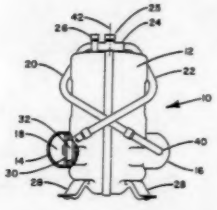
John J. Jacobs, Pulaski, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Division of Ser. No. 7,868, Jan. 31, 1979, Pat. No. 4,281,972. This application Feb. 2, 1981, Ser. No. 230,571

The portion of the term of this patent subsequent to Aug. 4, 1998, has been disclaimed.

Int. Cl.³ F04B *35/04*

U.S. Cl. 417—53 **1 Claim**



1. A method of compressing gas in a motor compressor unit enclosed within a hermetically sealed shell and having a plurality of compression cylinders with a reciprocating piston located within each compression cylinder and a corresponding plurality of suction plenums, which comprises the steps of:

passing suction vapor exteriorly of the compressor shell from a common source of suction vapor to the plurality of suction plenums through a corresponding number of equal length suction vapor conduits extending from the common source of the suction vapor to the suction plenums;

periodically pulsing the pressure in the suction plenums and the equal length vapor conduits by reciprocating the pistons within the cylinders, to attain a minimum pressure in said suction plenums when the pistons are substantially at bottom dead center;

periodically discharging the compressed vapor from the compression cylinders into the interior of the shell of the compressor unit; and

supercharging the cylinders with suction gas by periodically admitting suction vapor from the suction plenums into the compression cylinders of the compressor, substantially at the time of a maximum pressure pulse in the suction plenums.

4,421,461

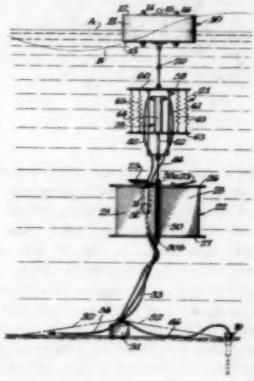
WAVE-POWERED DESALINATION OF SEAWATER

Douglas C. Hicks, Newark, Del., and Charles M. Pleass, Havre de Grace, Md., assignors to University of Delaware, Newark, Del.

Continuation-in-part of Ser. No. 76,217, Sep. 17, 1979, abandoned. This application May 26, 1981, Ser. No. 266,660

Int. Cl.³ F03B *3/12*

U.S. Cl. 417—53 **4 Claims**



3. The process of pumping seawater employing a wave-powered pumping device comprising:

(a) a non-Archimedean wave follower connected in sequence from top to bottom with

(b) a piston pump having a cylinder within which is mounted a reciprocatory piston;

(c) attachment means connecting one of the pair consisting of said cylinder and said reciprocatory piston with said wave follower and the other of said pair with mooring selected from anchors, alone or in combination with a reaction unit;

wherein the product of the effective waterline plane area and the wave height divided by the product of the piston area and the required pressure is between 50 and 200.

4,421,462

VARIABLE DISPLACEMENT PUMP OF VANE TYPE

Takeshi Obe, Matsuyama, Japan, assignor to Jidosha Kiki Co., Ltd., Tokyo, Japan

Filed Nov. 19, 1980, Ser. No. 208,454

Claims priority, application Japan, Dec. 10, 1979, 54-160106; Sep. 29, 1980, 55-135485

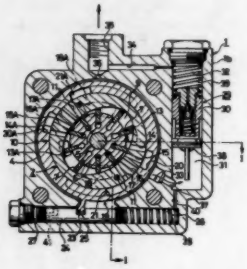
Int. Cl.³ F04B *49/02, 49/08*; F04C *2/00, 15/02*

U.S. Cl. 417—310 **15 Claims**

1. In a variable displacement vane pump including a rotor which is driven for rotation by a drive shaft, a plurality of vanes displaceably disposed in radial grooves formed in the rotor, a pair of sideplates which abut against the opposite ends of the rotor and the vanes, a cam ring located between the both sideplates and against which the outer end of the vanes abut in

sliding contact therewith, at least one intake port which permits a flow of a fluid into a vane chamber defined between a pair of adjacent vanes as the volume of the vane chamber increases, at least one discharge port which permits a flow of the fluid out of the vane chamber as the volume thereof decreases, a low pressure chamber disposed for communication with the intake port, and a high pressure chamber disposed for communication with the discharge port;

the improvement wherein the pump is of a balanced pressure type including a pair of pump sections which are located symmetrically to each other with respect to the drive shaft, each said pump section including at least two sets of



intake and discharge ports, in each pump section the spacing between an intake port and a discharge port of the first set as well as the spacing between an intake port and a discharge port of the second set being chosen to be in substantial coincidence with the spacing between a pair of adjacent vanes, either the intake or the discharge ports of the second set being disposed intermediate the intake ports and the discharge ports of the first set, further including control means which controls a communication between selected intake port or ports and the low pressure chamber and a communication between a selected discharge port or ports and the high pressure chamber.

4,421,463

DOWNHOLE PUMP

Bert Lee, Salt Lake City, Utah, assignor to Jeff D. Morgan, Edmond, Okla.

Filed Jul. 8, 1981, Ser. No. 290,835

Int. Cl.³ F04B *47/08*

U.S. Cl. 417—383 **7 Claims**

1. A downhole pump for lifting fluid from an underground chamber comprising:

a casing extending upwardly from the chamber;

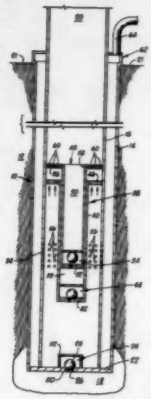
a tubing coaxially aligned within said casing, said tubing including holes located adjacent the lower end thereof;

a floor mounted on the bottom of said casing, said floor including a check valve for permitting upward flow only into said tubing;

a movable bucket having a cylindrical side, a bottom, and an open top, said bucket being positioned over said floor and including a check valve for permitting upward flow only mounted on the bottom thereof; 'an annular fin extending from the side of said bucket, said fin being of a size which constrains said bucket to vertical movement along the tubing axis;

an annular plunger over which said bucket slides, said plunger being positioned over said bucket and including a bottom having a check valve mounted thereon for permitting only upward fluid flow; and

plunger support means mounted on said tubing wall for fixedly supporting said plunger;



said tubing holes permitting fluid flow between said casing and said tubing during bucket movement.

4,421,464

LIQUID HELIUM PUMP

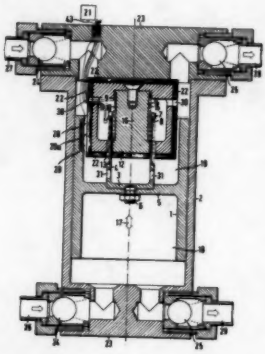
Kurt Schmidt, Karlsruhe-Waldstadt, and Klaus Jentzsch, Stutensee, both of Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe Gesellschaft mit beschränkter Haftung, Karlsruhe, Fed. Rep. of Germany

Filed Apr. 11, 1980, Ser. No. 139,695

Claims priority, application Fed. Rep. of Germany, Apr. 14, 1979, 2915199

Int. Cl.³ F04B *17/04, 45/02*

U.S. Cl. 417—412 **9 Claims**



1. In a pump for driving liquid helium, including a pump housing having means defining a pump inlet and a pump outlet; a pumping member arranged in the housing for reciprocating motion parallel to a pump axis for drawing liquid helium into the pump through the pump inlet and driving liquid helium out of the pump through the pump outlet; and an electromagnetic drive means contained in its entirety in the pump housing for generating an axially oriented force applied to the pumping member to reciprocate the same; the improvement wherein said electromagnetic drive means comprises:

(a) a stationary electromagnet supported in said pump housing and including

(1) non-magnetic first and second coil carriers fixedly

supported in said pump housing and surrounding said axis; said second coil carrier coaxially surrounding said first coil carrier and defining therewith an annular clearance constituting an air gap surrounding said axis and having a length dimension parallel to said axis;

(2) first, second, third and fourth superconductive energizing solenoids carrying an energizing current to generate a magnetic flux in said air gap; said first and second energizing solenoids being mounted in an axially spaced relationship on said first coil carrier; said third and fourth energizing solenoids being mounted in an axially spaced relationship on said second coil carrier; said first energizing solenoid being in radial alignment with said third energizing solenoid and said second energizing solenoid being in radial alignment with said fourth energizing solenoid;

(b) a non-magnetic third coil carrier attached to said pumping member to move therewith as unit; said third coil carrier surrounding said axis and having a travelling path passing through said air gap and being parallel to said axis;

(c) a superconductive cylindrical moving coil carrying a control current and being mounted on said third coil carrier coaxially with said first, second, third and fourth energizing solenoids for traversing the magnetic flux in said air gap whereby an electromagnetic force parallel to said axis is exerted on said moving coil for displacing said moving coil, said third coil carrier and said pumping member as a unit; said moving coil having an axial length which is at least approximately equal to the axial distance between said first and second energizing solenoids; and

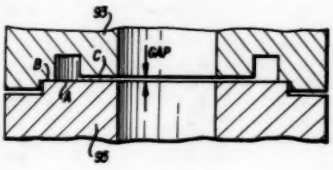
(d) means for supplying first, second, third and fourth energizing solenoids and said moving coil with said energizing current and said control current, respectively.

4,421,465

APPARATUS PROVIDING UNIFORM RESIN DISTRIBUTION IN A COEXTRUDED PRODUCT

Fox J. Herrington, Holcomb, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 201,688, Oct. 30, 1980, Pat. No. 4,344,907.
This application Mar. 18, 1982, Ser. No. 359,554
Int. Cl.³ B29F 3/06
U.S. Cl. 425—133.1 **1 Claim**



1. A die for coextruding first and second molten streams of resin comprising:

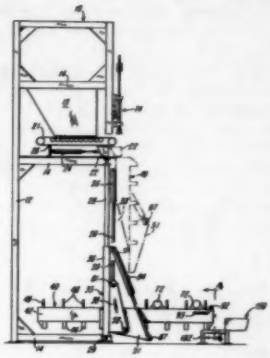
a first flow channel for one of said resin streams, a second flow channel for the other of said resin streams, said first and second channels terminating in a molten resin junction region, and a flow channel coupling said junction region to an extrusion orifice, at least one of said first and second flow channels being defined by first and second opposing die surfaces, each respectively provided on first and second die members, said first and second die members engaging with one another at respective planar engaging faces, the planar engaging face of said first die member being offset from and in parallel with at least a portion of the opposing die surface of said first die member and the planar engaging face of second die member being in parallel with at least a portion of the opposing die surface of said second die member said offset defining the gap size of said at least one flow channel and said parallel arrangement insuring no significant gap error in said channel.

4,421,466

APPARATUS FOR MOLDING CONCRETE ARTICLES AND THE LIKE

Charles J. Heitzman, Honolulu, Hi., assignor to Auto-Cast International, Ltd., Honolulu, Hi.

Filed Jun. 29, 1981, Ser. No. 278,173
Int. Cl.³ B28B 21/90
U.S. Cl. 425—125 **21 Claims**



1. In apparatus for molding articles of self-hardening moldable material and including a mold box defining a molding cavity, means supporting said mold box for tilting movement between a generally vertical filling position and a generally horizontal stripping position, means for supplying the moldable material to said mold box when in said filling position to form a molded article within said mold box, means for receiving a molded article from said cavity after said mold box is moved to said stripping position, and means for stripping the molded article from said mold box, the improvement wherein said means supporting said mold box comprise a movable carriage having pivot means supporting an intermediate portion of said mold box for tilting movement, linear guide means supporting said carriage for generally vertical movement, power actuating means for tilting said mold box relative to said carriage, and power actuated means for moving said carriage vertically before said mold box is tilted completely to said filling position.

4,421,467

INJECTION MOLDING MACHINE DIAGNOSTIC SYSTEM

Dennis W. Richmond, Loveland, Ohio, assignor to HPM Corporation, Mount Gilead, Ohio

Filed Mar. 11, 1982, Ser. No. 357,185
Int. Cl.³ B29G 5/00
U.S. Cl. 425—136 **15 Claims**

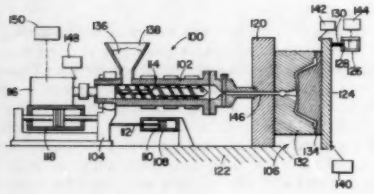
1. In an injection molding machine having clamp means for opening and closing a mold, an extruder having a rotatable plasticizing screw, and injection means for axially moving the screw to inject plasticized material into a mold, said clamp means, extruder and injection means each comprising a plurality of components which normally assume a given proper state during the cycling of the machine through its operating sequence comprising a plurality of major operating steps, it being necessary for a respective given plurality of components to assume their proper states for the machine to accomplish each major operating step; a diagnostic monitoring system for monitoring the opening and closing of the mold by the clamp means, the operation of the extruder and the injection of the

material into the mold by the injection means as the injection molding machine cycles through its major operating steps in its operating sequence comprising:

a plurality of monitor switch means,

a plurality of means respectively connected between said monitor switch means and the components of the clamp means, extruder and injection means for activating each said monitor switch means when the pertaining component assumes its proper state during the operation of the clamp means, extruder or injection means with which it is associated and for deactivating each said monitor switch means when the pertaining machine component fails to assume its proper state during the operation of the clamp means, extruder or injection means with which it is associated,

a plurality of visual indicators physically grouped in a plurality of sequentially arranged sets wherein each set comprises a plurality of said indicators and each set is spatially set apart from the other sets so that it can be readily distinguished from the other sets, each set corresponding to a major operating step of the machine and comprising a plurality of indicators that pertain to the components that are required to assume their proper states before the machine can perform the pertaining major operating step,



means operatively interconnecting said indicators with said monitor switch means for one of energizing or deenergizing the respective sets of indicators in succession in the order in which they are arranged as said machine cycles through its major operating steps if the monitor switch means connected to the indicators in the respective set are activated and for the other of energizing or deenergizing one or more of the indicators in a set if the monitor switch means connected to the respective said one or more indicators are deactivated, the pattern of activated and deactivated indicators in each set indicating whether a fault exists for the pertaining major step and also the source of the fault, if one exists, for the pertaining major step,

whereby if the clamp means opens and closes the mold properly and the extruder operates properly and the injection means properly injects the charge of material, the sets of indicators are sequentially one of energized or deenergized and if the machine develops a fault associated with the operation of any of the clamp means, extruder or injection means so that one of the pertaining components does not assume its proper state, the monitor switch means associated with that part will be deactivated and will cause the indicator connected thereto to be the other of energized or deenergized so as to indicate the source of the fault by the pattern of energized indicators in the pertaining set.

4,421,468

FOAM MOLDING MACHINE

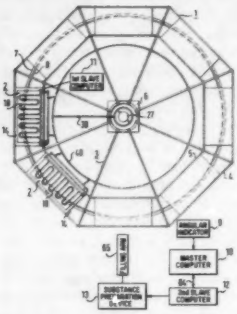
Horst Bokelmann, Grönenbach, Fed. Rep. of Germany, assignor to Metzeler Schaum GmbH, Munich, Fed. Rep. of Germany

Filed May 18, 1982, Ser. No. 379,293

Claims priority, application Fed. Rep. of Germany, May 22, 1981, 3120519

Int. Cl.³ B29D *27/04*

U.S. Cl. 425—143 **6 Claims**



1. Foam molding apparatus, comprising a rotatable table, a plurality of molds disposed on said table, means for heating and cooling each of said molds, means being fixed in place relative to said table for filling a specific quantity of foamable reaction mixture having several components into each of said molds, means for opening and closing each of said molds, means disposed in vicinity of said table for indicating an angular position of said table and said molds by generating signals representing the angular position of said table and for initiating functions of the apparatus corresponding to the position of said table, stationary master computer means disposed outside said table and connected to said indicating means for coordinating operations of the apparatus by receiving said signals from said indicating means and determining time periods based on said angular position, first slave computer means disposed on and rotatable with said table, said first slave computer means being connected to and controlled by said master computer means and being connected to said opening and closing means and to said heating and cooling means for opening and closing each of said molds in dependence on the position thereof and for controlling the heating and cooling of each of said molds in dependence on time, stationary second slave computer means disposed outside said table, said second slave computer means being connected to and controlled by said master computer means and being connected to said filling means for controlling said filling means in dependence on the position of said molds, said filling means including a separate metering pump for dispensing each of the reaction mixture components.

4,421,469

INJECTION MOLDING MACHINE ASSEMBLY HAVING MEANS FOR SELECTIVELY CHANGING AT LEAST TOOL UNIT OR A PLASTICIZING AND EJECTION UNIT

Caspar Egger, Glarus; Rudolf Krebser, Schübelbach, and Hans Leuzinger, Netstal, all of Switzerland, assignors to Netstal-Maschinen AG, Switzerland

Filed Jun. 23, 1982, Ser. No. 391,289

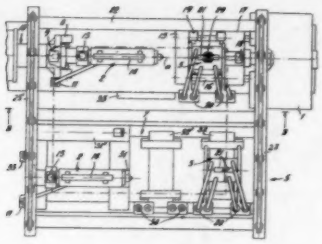
Claims priority, application Switzerland, Jul. 2, 1981, 4374/81

Int. Cl.³ B29F *1/00*

U.S. Cl. 425—183 **7 Claims**

1. An injection molding machine assembly for use with an operating injection machine, comprising a tool unit mounting support adjacent the injection machine, a plasticizer and ejection unit mounting support adjacent said tool unit mounting support, first operating and securing coupling means associ-

ated with said tool unit mounting support for connecting a tool unit, second operating and securing coupling means associated with said ejection unit mounting support for connecting a plasticizer and ejection unit, magazine means defining at least one of an additional plasticizer and ejection unit mounting support which is substantially the same as said plasticizer and ejection unit mounting support, the first ejector and plasticizer



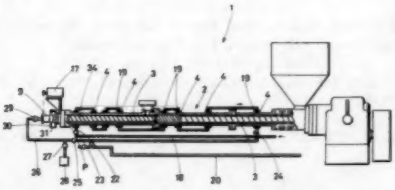
associated with said injection unit mounting support, a first tool unit associated with said tool unit mounting support, said first ejector and plasticizer associated with said magazine means, and transport means movable between said magazine, said plasticizer and ejection unit mounting support for transporting said first ejector and plasticizer between said plasticizer and ejection unit mounting support and said magazine means.

4,421,470

RESIN PELLET PRODUCING MACHINE

Kensaku Nakamura, 271-1, Bessho-cho, Matsubara, Osaka-Pref., Japan

Filed Mar. 4, 1982, Ser. No. 354,641
Int. Cl.³ B29C *17/14*
U.S. Cl. 425—311 **2 Claims**



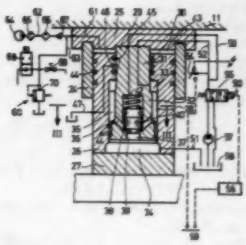
1. In a resin pelletizing apparatus, comprising
an extruding barrel comprising an elongated cylinder tube having an entrance end and an exit end and through which resin is processed;
heating means disposed about said barrel and comprising interconnected pipe means with an inlet and an outlet;
means for supplying hot water to said inlet of said interconnected pipe means to supply heat to said heating means;
die means positioned at said exit end of said extruder barrel for producing strands of extruded resin said die means having an outer surface area;
cutter means mounted on the outer surface area of said die means for cutting said strands into pellets; and
means for cooling the resulting pellets of said extruded resin;
wherein the improvement comprises a recirculating pipe means connected to said outlet of said interconnected pipe means and connected to said cooling means, whereby the water used to heat said barrel after exposure to said heating means is used to cool said pellets after cutting by said cutting means.

4,421,471

VIBRATING HYDRAULIC PRESS

Willy Vogt, Zürich, Switzerland, assignor to Bucher-Guyer A.G., Niederweningen, Switzerland

Division of Ser. No. 250,233, Apr. 2, 1981. This application Sep. 23, 1982, Ser. No. 421,951
Claims priority, application Fed. Rep. of Germany, Apr. 11, 1980, 3014068
Int. Cl.³ B28C *21/50*; B29C *3/00*
U.S. Cl. 425—421 **12 Claims**



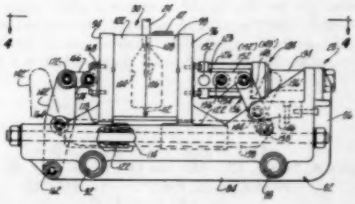
1. A press for the manufacture of fire bricks, comprising in combination:
a mold, including a bottom normally open on top, and adapted to receive ceramic material,
a main piston disposed normally in an initial position above said mold, and forming a cover surface of said mold when entering the top of the mold,
drive means in driving connection with said main piston for urging said main piston to exert a non-oscillatory pressure onto said ceramic material, said main piston being displaceable by said drive means from said initial position in a direction towards the bottom of said mold, said drive means being hydraulic and being associated with pneumatic energy storage means for urging said main piston toward the bottom of the mold, the hydraulic drive means also being connected for urging the main piston in a direction away from the bottom of the mold and control means for controlling fluid supplied by said hydraulic drive means to provide oscillating pressure on said main piston.

4,421,472

CLAMP FOR BLOW MOLDING MACHINE

Merritt W. Martin, Jr., Saline, Mich., assignor to R & B Machine Tool Company, Saline, Mich.

Filed Aug. 31, 1981, Ser. No. 297,589
Int. Cl.³ B29C *17/07, 17/12*
U.S. Cl. 425—527 **10 Claims**



1. In a blow molding machine of the type comprising:
at least one work station adapted to support a workpiece,
first and second platens adapted to carry first and second mold sections, respectively,
and a clamp supporting the platens for movement along a

clamping axis to close and open the mold sections with respect to the workpiece,

the improvement wherein said clamp comprises:

an elongate body extending in the direction of said clamping axis,

actuating means disposed between said body and said first platen for moving said first platen along said clamping axis,

a first lever being pivotally coupled with said body and with said first platen,

a second lever being pivotally coupled with said body and with said second platen,

and a pull bar being pivotally coupled with said first lever and said second lever,

pivotal couplings on said levers being spaced so that movement of said first platen along said clamping axis imparts equal and opposite movement to said second platen.

4,421,473

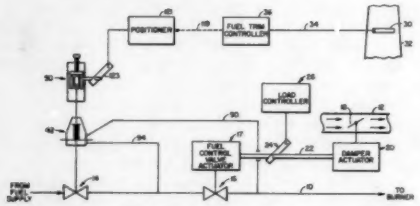
APPARATUS FOR OPERATING A BURNER AT AN OPTIMAL LEVEL

Steve B. Londerville, Half Moon Bay, Calif., assignor to Coen Company, Inc., Burlingame, Calif.

Filed Jul. 27, 1981, Ser. No. 287,383

Int. Cl.³ F23N 5/00

U.S. Cl. 431—76 **6 Claims**



1. In a system for controlling the flow of a fuel and air mixture to a burner wherein both the fuel and air flow rates are adjusted in a substantially fixed ratio in response to load changes on the burner, and wherein the fuel flow rate is adjusted by a fuel control valve mounted in a fuel supply line, an apparatus for marginally adjusting the fuel flow to the burner to maintain a combustion characteristic in the burner at a desired value, the apparatus comprising:

a self-adjusting valve mounted in the fuel supply line and upstream of the fuel control valve said self-adjusting valve including means for sensing the differential pressure across the fuel control valve and means for maintaining the pressure differential at a set point;

set means for changing the setting of the self-adjusting valve to thereby vary the set point and the differential pressure across the control valve;

means for monitoring the combustion characteristic; and

means for operating the set means in response to a monitored change in the combustion characteristic to adjust the set point so that the combustion characteristic is returned to the desired value.

4,421,474

HYDROGEN GAS BURNER

Stanley A. Meyer, 2222 Marlane Dr., Grove City, Ohio 43213

Filed Aug. 25, 1982, Ser. No. 411,245

Int. Cl.³ F23L 7/00

U.S. Cl. 431—115 **13 Claims**

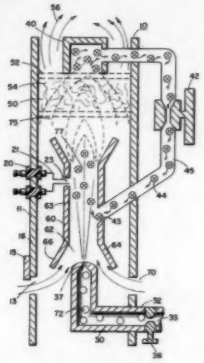
1. A hydrogen gas burner for utilization as a heat source comprising:

a housing having a double open-end combustion chamber positioned therein,

a source of hydrogen gas and a nozzle connected thereto for directing the hydrogen gas into one end of said combustion chamber,

ambient air intake means in said housing positioned to direct ambient air into said combustion chamber,

and a source of a non-combustible gas, return line means for returning said non-combustible gas to said combustion chamber for mixing with said hydrogen gas and said ambient air,



an ignitor for igniting said mixture of gasses,

a barrier positioned adjacent to other open-end of said combustion chamber,

said ignited mixture of gasses superheating the air in said housing and directing the same to said barrier,

said barrier further comprising a heat dissapating surface to disperse heated air to the utilization means.

4,421,475

BURNER FOR THE COMBUSTION OF LIQUID FUELS IN THE GASEOUS STATE

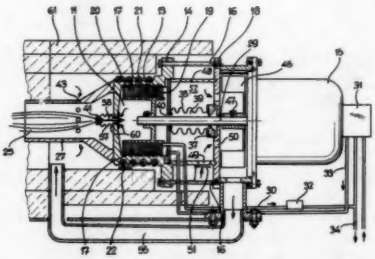
Adolf Frick, Balzers, Fed. Rep. of Germany, assignor to Stoechio-matic AG, Schaan, Fed. Rep. of Germany

Filed Mar. 9, 1981, Ser. No. 241,976

Claims priority, application Switzerland, Mar. 14, 1980, 2001/80

Int. Cl.³ F23D 11/44

U.S. Cl. 431—207 **26 Claims**



1. A burner for the combustion of liquid fuel in the gaseous state, said burner comprising:

a gasification chamber having at least one heatable wall heatable by heating means;

means for creating a relatively high pressure in the gasification chamber to prevent air from flowing into said gasification chamber and to discharge gasified fuel at a relatively high pressure;

means for permitting fuel to be introduced into said gasification chamber;

means for permitting gasified fuel to exit from said gasification chamber;

wiping means for cleaning said heatable wall of said gasification chamber; and,

motor means located outside of the gasification chamber for actuating said wiping means inside of said gasification chamber to remove deposits from the gasification chamber walls so that said deposits exit from said gasification chamber with said gasified fuel.

4,421,476

GASIFICATION BURNER

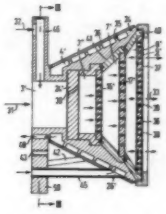
Peter Gulden; Alfred Michel, both of Erlangen, and Hana Kostka, Nuremberg, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 77,041, Sep. 19, 1979, abandoned. This application May 10, 1982, Ser. No. 376,569

Claims priority, application Fed. Rep. of Germany, Sep. 21, 1978, 2841105

Int. Cl.³ F23D *13/14, 13/42*

U.S. Cl. 431—243 **11 Claims**



1. In a gasification burner comprising: a primary air feed stub; an antechamber for mixing an at least partly evaporated liquid fuel with primary air, having an inlet for evaporated liquid fuel and a primary air inlet; a catalytic device downstream of the antechamber for converting the fuel vapor air mixture into a fuel gas; a mixing chamber downstream of the catalytic device, and having inlets for said fuel gas and secondary air, for mixing the fuel gas with secondary air to form a fuel-gas mixture; means defining an annular space concentrically surrounding the antechamber, the catalytic device, the mixing chamber, said annular space separated from the antechamber by a ring wall, and having an inlet coupled to said primary air feed stub; a conically flared combustion chamber terminatd by a perforated burner plate of porous material; an ignition chamber arranged between the combustion chamber and the mixing chamber coupling the combustion chamber to the mixing chamber such as to feed the fuel gas-air mixture from the mixing chamber to the combustion chamber, said annular space also surrounding said ignition chamber; a front chamber, located upstream of the antechamber, which changes into a ring canal which surrounds the inlet for evaporated liquid fuel of the antechamber comletely and the annular space and the catalytic device at least over part of their length; a fuel inlet coupled to the end of said ring canal remote from said front chamber; a heat source contained in said ring canal for evaporating the fuel; a heat source contained in said annular space for preheating the primary air during the starting process and for aiding in the event of load changes; radial canals contained in said ring wall forming the primary air inlet to said antechamber and connecting said annular space to said antechamber; homogenizing devices, arranged in said antechamber and in said mixing chamber; and means separating said ignition chamber from said mixing chamber such as to prevent backfiring, the improvement comprising:

(a) the annular space also enclosing the conically flared combustion chamber in ring fashion and extending up to the immediate vicinity of the burner plate;

(b) the primary air feed stub opening into the annular space in the immediate vicinity of the burner plate; and

(c) baffles disposed in said annular space conducting the primary air stream being fed in from said primary air feed stub to the radial canals of the ring wall in a winding flow path about the combustion chamber and the ignition chamber.

4,421,477

COMBUSTION WICK

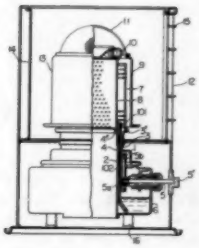
Kinichi Adachi, Takarazuka; Hisanori Shimoda, Neyagawa; Yasushi Hirata, Nara, and Yoshimi Ohmukai, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 7, 1982, Ser. No. 366,168

Claims priority, application Japan, Apr. 13, 1981, 56-56072; May 14, 1981, 56-73057; Aug. 19, 1981, 56-129950; Aug. 20, 1981, 56-131150; Oct. 26, 1981, 56-170909; Nov. 4, 1981, 56-176872; Nov. 9, 1981, 56-179454

Int. Cl.³ F23D *3/18*

U.S. Cl. 431—325 **7 Claims**



1. A combustion wick comprising a fuel suck-up portion where liquid fuel is sucked up and a fuel gasifying portion provided above said fuel suck-up portion, wherein of said fuel suck-up and fuel gasifying portions, at least the fuel gasifying portion is formed from silica-alumina type ceramic fibers with an organic binder, with at least a part of said portion being impregnated with a coating material composed principally of an inorganic pigment, silicic anhydride and a surface active agent.

4,421,478

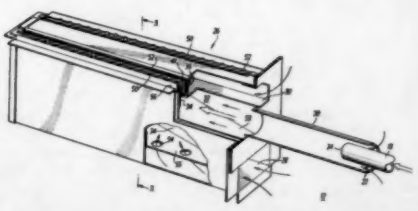
HIGH EFFICIENCY FUEL BURNER

Bruce R. Maike, Westerville; Carl S. Fladt, and Frank E. Lavely, both of Galloway, all of Ohio, assignors to Magic Chef, Inc., Cleveland, Tenn.

Filed Aug. 3, 1981, Ser. No. 289,283

Int. Cl.³ F23D *15/00*

U.S. Cl. 431—351 **7 Claims**



1. In a burner having an air supply chamber and means for

maintaining a predetermined air pressure in said chamber, the improvement comprising:

a fuel tube having an open end in said air supply chamber and a fuel supply conduit extending into said tube and having a fuel discharge orifice in said fuel tube;

a burner assembly adjacent said supply chamber and comprising a housing having at least three burner chambers therein;

said fuel tube opening into a first of said burner chambers and plural burner ports communicating with said first burner chamber;

a separate metering port from said air supply chamber to each of the second and third burner chambers; and

each of said second and third burner chambers communicating with secondary air ports disposed closely adjacent said plural burner ports whereby a mixture of fuel and primary air is directed through said first burner chamber to said plural burner ports and metered secondary air is directed through said second and third burner chambers to positions closely adjacent said plural burner ports to provide a flame spread over an area of heating surface.

4,421,479

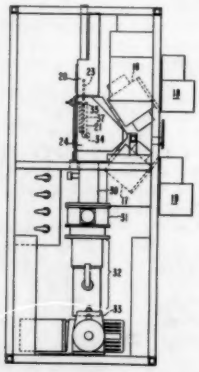
PROCESS FOR TREATING A SEMICONDUCTOR MATERIAL BY BLACKBODY RADIATION SOURCE WITH CONSTANT PLANAR ENERGY FLUX

Richard S. Muka, Topsfield, and Carl J. Russo, Ipswitch, both of Mass., assignors to Varian Associates, Inc., Palo Alto, Calif.

Division of Ser. No. 262,838, May 12, 1981. This application Apr. 1, 1983, Ser. No. 481,206

Int. Cl.³ F27B *17/00*

U.S. Cl. 432—31 **6 Claims**



1. A process for thermally treating a semiconductor material, comprising:

introducing said material into a processing chamber;

producing a vacuum condition in said processing chamber;

heating said material in said chamber by a blackbody source having a constant planar energy flux characteristic, said wafer being positioned in essentially parallel planar alignment with said blackbody source.

4,421,480

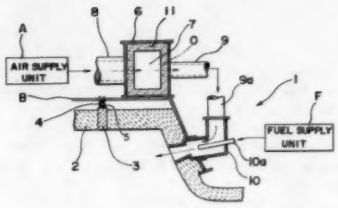
CEILING BEAM CONSTRUCTION FOR HEATING FURNACE

Tetsuya Tokitsu, Takarazuka; Saburo Harada, Nara; Jiro Yamasaki, and Akihiro Nakama, both of Oita, all of Japan, assignors to Chugai Ro. Kogyo Co., Ltd., Osaka and Nippon Steel Corp., Tokyo, both of, Japan

Filed Dec. 28, 1981, Ser. No. 335,276

Int. Cl.³ F27D *1/12*; F23M *5/06*; F27B *3/00*

U.S. Cl. 432—238 **7 Claims**



1. A ceiling for a heating furnace having side walls extending in widthwise and lengthwise directions comprising:

a ceiling portion for covering the interior of the furnace, ceiling beam means, including a plurality of widthwise extending, lengthwise spaced beams, for vertically supporting said ceiling portion above the side walls of the furnace; said beams having closed cross sections, the interiors of said beams comprising means for transporting gas flow within said furnace so as to reduce the space required in the furnace for separate gas ducts.

4,421,481

FURNACE FOR HEATING SLABS, BILLETS, ROUGH CASTINGS AND THE LIKE

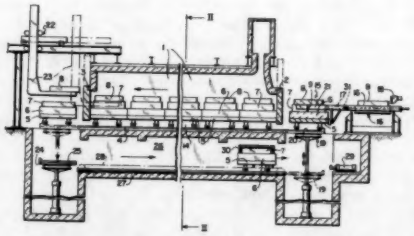
Peter Holz, Essen; Heinrich Patalon, Bochum, and Edgar Hartkopf, Mülheim, all of Fed. Rep. of Germany, assignors to Didier Engineering GmbH, Essen, Fed. Rep. of Germany

Filed Dec. 17, 1981, Ser. No. 331,816

Claims priority, application Fed. Rep. of Germany, Jan. 16, 1981, 3101230; Aug. 17, 1981, 3132373

Int. Cl.³ F27D *3/00*; F27B *9/26*

U.S. Cl. 432—239 **15 Claims**



1. A furnace for heating all sides of products such as slabs, billets, rough castings and the like, said furnace comprising:

a furnace chamber having a charging end and a discharging end;

support means for supporting products to be heated within said chamber, said support means comprising a plurality of carriages positioned throughout the length of said furnace chamber for sequential movement therethrough from said charging end thereof to said discharging end thereof, each said carriage including a support bench having extending upwardly therefrom support members for supporting a

product to be heated, said support members extending longitudinally in the direction of movement of said carriages through said furnace chamber;

a charging station located adjacent said charging end of said furnace chamber for loading a product to be heated onto a said carriage and introducing the thus loaded carriage into said furnace chamber, thereby displacing loaded said carriages within said furnace chamber toward said discharging end and discharging a downstream-most said loaded carriage from said discharging end of said furnace chamber, said charging station including a grate formed of elongated finger-like projections extending in said direction, said projections being positioned to fit between adjacent said support members, each said projection having mounted thereabove a roller having a rotational axis extending in said direction, the distance between adjacent said rollers being at least equal to the distance between adjacent said support members;

unloading means, located adjacent said discharging end, for unloading a heated product from said carriage discharged from said discharging end;

a return chamber exterior of said furnace chamber and extending from adjacent said unloading means to said charging station to enable said carriage unloaded by said unloading means to be returned to said charging station; and

heat insulation means within said return chamber for reducing heat loss from said unloaded carriage while said unloaded carriage is in said return chamber.

4,421,482

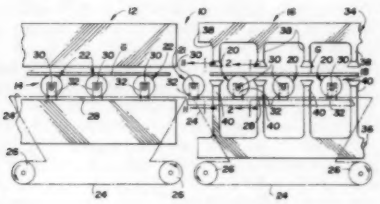
CONVEYOR ROLL FOR CONVEYING HEATED GLASS SHEETS

Ronald A. McMaster, 420 Water St., Woodville, Ohio 43469

Filed Jan. 7, 1982, Ser. No. 337,790

Int. Cl.³ B21B *31/08*; F27B *9/00*; F27D *3/00*

U.S. Cl. 432—246 **20 Claims**



20. In hot glass sheet handling apparatus including a generally rigid member, the improvement comprising: a support on the rigid member having an outer surface of uncoated aromatic polyamide fibers which are stable at a sufficiently high temperature to directly engage and support glass sheets heated to a temperature of about 1100 to 1200 degrees Fahrenheit.

4,421,483

DELIVERY SYSTEM FOR DENTAL INSTRUMENTS OR THE LIKE

Helmut Pietschmann, Karlsbad; Manfred Schmidt, Karlsruhe, and Emil Hirth, Malsch, all of Fed. Rep. of Germany, assignors to Sybron Corporation, Rochester, N.Y.

Filed Mar. 4, 1981, Ser. No. 240,486

Claims priority, application Fed. Rep. of Germany, Apr. 10, 1980, 3013882

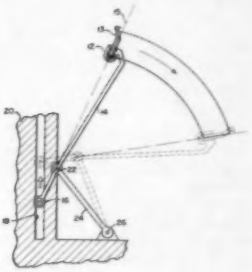
Int. Cl.³ A61G *1/14*

U.S. Cl. 433—77 **1 Claim**

1. In a dental unit having a plurality of nests, each nest releasably supporting a dental treatment instrument and being movable between a stored position and a readiness position, the improvement comprising:

(a) a movable support mechanism connecting each of said nests to the dental unit for moving said nest and dental instrument through an arcuate path of travel between said storage and readiness positions, each said mechanism including an elongated swivel arm connected at one end thereof to a nest and pivoted at the other end thereof for rotational movement by which said nest is moved through said arcuate path, said mechanism acting to control the orientation of said nest such that the axis of said instrument assumes a generally horizontal attitude and said path of travel assumes a generally downward direction as said readiness position is approached; and

(b) selection means operatively connected to said movable support mechanism for initiating movement of a selected nest towards said readiness position, said selection means being located on said dental unit beneath said readiness position, wherein said support mechanism is further defined as:



(i) said elongated swivel arm having one end slidably captured in a vertical groove formed in a wall of said unit and a free end;

(ii) said instrument nest on said free end arranged to hold an instrument such that said instrument forms an extension of said swing arm with the axis of said instrument extending in generally the same direction as said arm;

(iii) a link having one end pivoted to said unit and a second end journaled to said swivel arm intermediate the ends thereof; and

(iv) said swivel arm being oriented in a generally upright position when said nest is in a stored position and said captured end moving vertically upward in said groove as said nest is brought to a readiness position.

4,421,484

DIGITAL SIMULATION APPARATUS

Antony J. Wakeling, Fleet; Alan D. Thompson, Farnborough, and Roy W. Sumner, Hartley Wintney, all of England, assignors to The Solartron Electronic Group Limited, Farnborough, England

Filed Mar. 17, 1980, Ser. No. 130,810

Claims priority, application United Kingdom, Mar. 21, 1979, 7909896

Int. Cl.³ G09B *9/00*

U.S. Cl. 434—3 **3 Claims**

1. Digital simulation apparatus for simulating a terrain-representative display of the kind produced by a movable scanning-type display device, comprising:

a main store for storing data representative, in a first co-ordinate form, of the terrain in a predetermined area, said data being divided into groups corresponding to respective contiguous zones of said area;

means for producing a signal representative of the current position of the scanning-type display device;

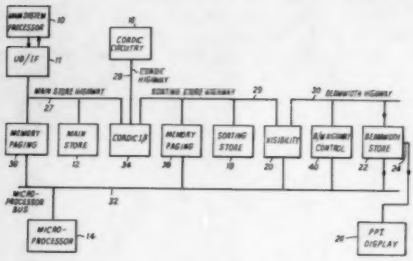
co-ordinate conversion means for converting data in the first co-ordinate form into data in a second co-ordinate form suitable for use in the scanning-type display device, said

first and second co-ordinate forms being different from each other;

a further store for receiving the converted data; and

means for generating the simulated display from the converted data in the further store;

wherein the means for producing the position-representative signals is also arranged to produce successive signals respectively representative of successive segments of scan of the scanning-type display device;



and wherein there is provided means responsive to the position-representative signals and the scan-segment-representative signals to select from the main store only groups of data corresponding to zones of said area determined by the current position and current scan segment and to apply the selected data to the co-ordinate conversion means for conversion therein.

4,421,485

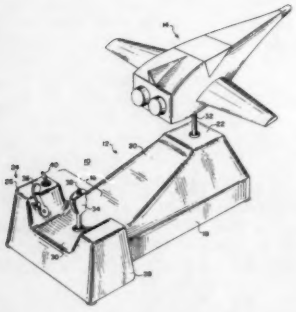
MODEL FLIGHT SIMULATOR

Mark J. Geschwender, 1550 S. 51st St., Lincoln, Nebr. 68506

Filed Mar. 3, 1981, Ser. No. 240,188

Int. Cl.³ G09B 9/08; A63H 27/04

U.S. Cl. 434—32 **11 Claims**



1. Apparatus for movably mounting a model to simulate positions of a vehicle comprising:

a support column adapted to have said model mounted to it;

a control stick adapted to be manually manipulated by an operator;

housing means having at least one rigid mounting element;

means for mounting said control stick at a first control-stick mounting point on said control stick to a first location on said mounting element with freedom to pivot at said first control-stick mounting point in all directions and to rotate therein;

means for mounting said support column at a first support-column mounting point on said support column to a second location on said mounting element with freedom to pivot at said first support-column mounting point in all directions and to rotate therein, whereby said first control-stick mounting point and first support-column mounting point are held at a fixed distance while permitting rotation and pivoting of said control stick and support column;

linkage means, connected to said control stick at a second control-stick mounting point on said control stick and to said support column at a second support-column mounting point on said support column, for holding said second control-stick mounting point and said second support-column mounting point at a fixed distance from each other;

said linkage means including mounting means for mounting said second control-stick mounting point and second support-column mounting points with freedom to pivot in all directions and to rotate;

said model being of a vehicle, whereby said control stick controls the attitude of said vehicle;

said linkage means including first and second elongated rigid members movable with respect to each other;

said first elongated rigid member has first and second ends;

said first end being movable in first and second directions with respect to said second control-stick mounting point;

said second end being movable in first and second directions with respect to said second support-column mounting point;

said second elongated rigid member has first and second ends;

said first and second elongated rigid member being movably mounted in two directions with respect to said second control-stick mounting point;

said second end of said second elongated rigid member being movably mounted in two directions with respect to said second support-column mounting point;

said mounting means for mounting said second control-stick mounting point and second support-column mounting points includes first and second arms;

said first arm being mounted to said control stick at said second control stick mounting means at an angle to the longitudinal axis of said control stick;

said second arm being mounted to said support column at said second support-column mounting point at an angle to the longitudinal axis of said support column;

one of said first and second rigid elongated members being connected at one end to said one arm; and

one of said first and second rigid elongated members being connected to said second arm, whereby rotation of said control stick within said first control-stick mounting point causes rotation of said support column within said first support-column mounting point.

4,421,486

FIELD OF VIEW TEST APPARATUS

Dorothy M. Baldwin, Lake Monroe; Frank J. Oharek, Maitland, and Archer M. Spooner, Orlando, all of Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 29, 1982, Ser. No. 362,829

Int. Cl.³ F41J 9/00

U.S. Cl. 434—44 **11 Claims**

1. An apparatus for determining field of view requirements of visual simulator designs comprising:

means for projecting a wide angle visual image such that it may be seen by a test subject, including means for optically varying the resolution of said projected image by an independent masking means to form a high resolution area of interest bounded by an instantaneous field of view having a lesser resolution such that the operational parameters of said area of interest may be determined; means for tracking eye position of said subject while viewing said image, outputting an electrical position indicating signal;

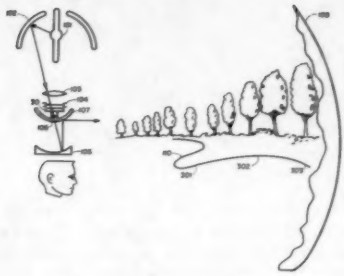
means for varying the position of said area of interest on said

projected image in accordance with said position indicating signal; and

means for selectively delaying said position indicating signal within a range of delays operably connected between said tracking means and said position varying means such that maximum allowable operational delays may be determined.

8. A method of determining field of view requirements of a visual simulator design comprising the steps of:

projecting a wide angle image on a screen, said projecting step including optically varying the resolution of said image by masking said image to form a pattern having an area of interest of high resolution bounded by an instantaneous field of view of lower resolution;



placing a test subject in a position to view said image;

assigning said subject a visual task related to said simulator design;

correlating the position of said area of interest with the line of sight of said test subject;

evaluating said test subject's performance of said assigned task as a function of the resolution pattern formed;

changing the variation of resolution of said image to form a new pattern;

repeating said task and evaluation;

repeating said pattern changing and task evaluation steps a plurality of times; and

selecting the most suitable pattern based on said plurality of evaluations.

4,421,487

ELECTRONIC LEARNING AID AND GAME

Thomas C. Laughon, and Michael I. Philpott, both of Lubbock, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 55,081, Jul. 5, 1979, abandoned. This application Oct. 7, 1981, Ser. No. 309,619

Int. Cl.³ G09B *7/02, 19/00*

U.S. Cl. 434—169 **8 Claims**

1. An electronic handheld learning aid comprising:

memory means for storing digital data representative of the letters of the alphabet, the digital data being arranged so as to be representative of the correct spellings of a plurality of words in a human language;

random access generating means for randomly selecting digital data representative of a selected one of said plurality of words stored in said memory means;

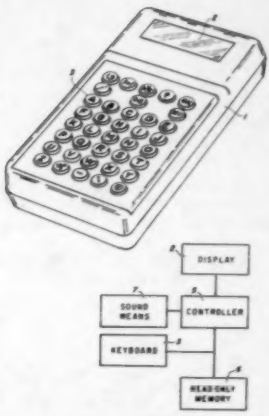
presentation means for providing at least an indication as to the identity of said selected one of said plurality of words;

operator input means for receiving an input from an operator of the learning aid representative of a plurality of letters of the alphabet as an attempt to spell said selected word chosen by said random access generating means;

said memory means being operatively coupled to said operator input means for storing digital data representative of certain letters of the alphabet arranged so as to be representative of the spelling of a word in a human language corresponding to the input from an operator as received by said operator input means;

means enabling alternatively said random access generating means or said memory means to store digital data representative of the spelling of a word corresponding to the input from an operator as received by said operator input means;

digital logic means including comparator means coupled to said random access generating means, said operator input means, said memory means and said presentation means for alternatively comparing the input received by said operator input means from an operator with said selected word chosen by said random access generating means or the input received by said operator input means from



another operator with the word represented by said digital data stored in said memory means corresponding to the input from a first operator as received by said operator input means and for providing a difference signal indicative of any difference therebetween; and

said presentation means being responsive to the presence or absence of said difference signal for providing a presentation indicative of the appropriateness of the input received by said operator input means with respect to said selected word chosen by said random access generating means or the word represented by the digital data stored in said memory means depending upon which one of said random access generating means and said memory means is enabled.

4,421,488

AID FOR CURING OR MITIGATING STAMMERING

Paul Parlenvi, Perhans Vag 11A, Hovas S-4308, and Ingemar H. G. Almslätt, Skattkarr 2, S 43370 Partille, both of Sweden

PCT No. PCT/SE81/00057, § 371 Date Nov. 6, 1981, § 102(e) Date Nov. 6, 1981, PCT Pub. No. WO81/02513, PCT Pub. Date Sep. 17, 1981

PCT Filed Mar. 3, 1981, Ser. No. 321,170

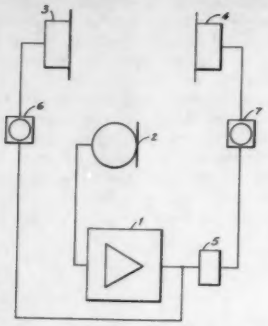
Claims priority, application Sweden, Mar. 10, 1980, 8001848

Int. Cl.³ G09B *5/04*

U.S. Cl. 434—185 **5 Claims**

1. A device for curing or mitigating stammering of a person, comprising: at least one microphone, an amplifier operatively connected to said microphone, two earphones operatively connected to said amplifier, and a delay unit in the connection between said amplifier and one of said earphones for delaying a signal from the amplifier to said one earphone in relation to the signal from the amplifier to the other earphone so that the

signal transmitted without delay to one ear of the person via said other earphone is perceived faster to the dominating cere-



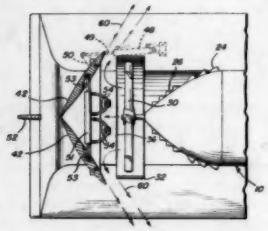
bral hemisphere of the person than to the other cerebral hemisphere to thereby at least mitigate stammering.

4,421,489

PROPELLER DRIVEN VEHICLE WITH FORWARD AND REVERSE CONTROL AIR RUDDERS

John Van Veldhuizen, 25975 SW. 182nd Ave., Homestead, Fla. 33030

Filed Apr. 20, 1981, Ser. No. 255,810
Int. Cl.³ B63H *7/00*
U.S. Cl. 440—37 **9 Claims**



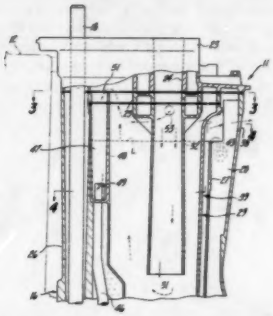
1. In combination with a vehicle to be propelled by a rearward discharge of fluid therefrom and including fluid jet developing means for discharging a rearward jet of fluid along a predetermined path, a steering, reversing and forward aggregate thrust nullifying control means including a pair of upstanding steering vanes mounted from said vehicle for oscillation about upstanding axes spaced transversely apart and disposed on opposite sides of the center line of said path and fixed relative to said vehicle, said control means including means operative to simultaneously similarly angularly displace said vanes about said axes, said vanes extending rearward of said axes distances greater than one-half the distance between said axes, said control means including first remotely operable and reversible motor means connected betwen said vehicle and one vane operative, only, to selectively angularly displace said one vane about its axis of oscillation relative to said vehicle and parallelogram link means supported solely from and connected between said vanes for substantially simultaneously and equally angularly displacing the other vane about its axis of oscillation relative to said vehicle responsive to angular displacement of said one vane by said first motor means, said parallelogram link means including second remotely operable and reversible motor means operative to vary the effective length of said link means whereby to effect angular displacement, only, of said other vane relative to said vehicle and one vane.

4,421,490

EXHAUST SILENCER STRUCTURE FOR OUTBOARD ENGINES

Ryoji Nakahama, Iwata, Japan, assignor to Yamaha Motor Co., Ltd. and Sanshin Industries Co., Ltd., both of, Japan

Filed Feb. 4, 1982, Ser. No. 345,716
Claims priority, application Japan, Feb. 23, 1981, 56-25282
Int. Cl.³ B63H *21/26*
U.S. Cl. 440—89 **7 Claims**



1. In an exhaust system for an outboard engine or the like having an expansion chamber, means for delivering exhaust gases from the engine to said expansion chamber, a high speed exhaust outlet extending from said expansion chamber to a point beneath the water level in which said engine is operated, and a low speed exhaust outlet comunicating with the atmosphere above the water level, the improvement comprising means forming a water reservoir having an exhaust gas inlet in communication with said reservoir above normal water level therein and an exhaust discharge at a predetermined level below said normal level and providing the only communication of said exhaust gas inlet with said low speed exhaust outlet for effecting low speed discharge of exhaust gases only through the water level in the water reservoir.

4,421,491

LINKING SAILBOARDS

Charles M. Pleass, Havre de Grace, Md. 21708

Filed Jun. 22, 1981, Ser. No. 275,722
Int. Cl.³ B63B *1/20*
U.S. Cl. 441—74 **17 Claims**

1. A sailboard assembly comprising at least two sailboards, each of said sailboards having a hull with a daggerboard extending downwardly from said hull and with a deck plug extending upwardly from said hull and with a mast plug connected by a universal joint to said deck plug and with a mast connected to said mast plug and with a sail mounted to said mast and with a boom connected to said sail whereby the user may control the position of said sail by manipulating said boom, at least one semi-rigid link connected at each end to a respective sailboard whereby each link joins two sailboards together with the sailboards being capable of being spaced from each other, swivel means connecting each end of said link

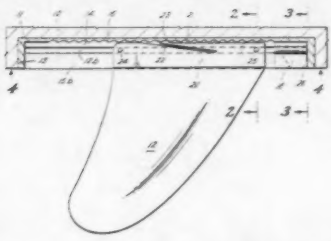
to its respective sailboard, said swivel means comprising a freely rotating collar mounted below said universal joint, and connecting means detachably connecting said collar to a respective end of said link.

4,421,492

ADJUSTABLE FIN SYSTEM

Donn W. Leva, Box 166 B-101, Galveston, Tex. 77551

Filed Jun. 16, 1981, Ser. No. 274,298
Int. Cl.³ A63C *15/05*
U.S. Cl. 441—79 **8 Claims**



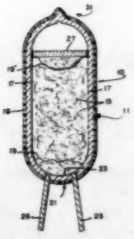
1. A fin attachment for surfboard and sailboards comprising:
means defining the ear undersurface as a channel along the longitudinal axis of the board wherein said channel has a ribbed inner surface;
a resilient finger provided on the base of the fin for coacting with said ribbed surface to slidably position and secure the fin along the longitudinal axis of said ribbed surface of such channel;
said fin provided with a slot cut at an angle to the base of the fin to form said resilient finger; and
means to receive and retain said fin base in said channel which allows for longitudinal movement of the fin in the channel.

4,421,493

METHOD OF MAKING PHOTOFLASH LAMP

Andre C. Bouchard, Peabody, and Robert F. Craig, Danvers, both of Mass., assignors to GTE Products Corporation, Stamford, Conn.

Filed Mar. 1, 1982, Ser. No. 353,302
Int. Cl.³ F21K *5/02*
U.S. Cl. 445—28 **7 Claims**



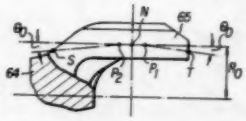
1. A method of making a photoflash lamp, said method comprising:
providing an elongated, light-transmitting tubular member having opposing open ends;
sealing a first open end of said tubular member, said sealed first end including a pair of lead-in wires secured therein each having an end portion having access to the interior of said tubular member;
positioning a first quantity of primer material within said tubular member through an opposing, second open end thereof, said first quantity of primer material electrically connected to said end portions of said lead-in wires;
positioning a predetermined quantity of combustible, light-producing material within said tubular member through said opposing, second open end thereof;
positioning a thin member within said tubular member through said opposing, second open end thereof, said thin member having located thereon a second quantity of primer material, said thin member being positioned within said tubular member such that said second quantity of primer material is positioned immediately adjacent said combustible material; and
sealing said second end of said tubular member to define and envelope.

4,421,494

TRIPOD TYPE CONSTANT VELOCITY UNIVERSAL JOINT

Yoshisumi Futamura, Toyota; Shigeki Komeiji, Okazaki; Shuhei Noro, Aichi; Junzo Hasegawa, Obu; Fumio Matsunari, Nagoya, and Toshiaki Ikeda, Aichi, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha and Toyota Chuo Kenky usho Kabushiki Kaisha, both of Aichi, Japan

Continuation-in-part of Ser. No. 73,872, Sep. 10, 1979, abandoned. This application Mar. 2, 1981, Ser. No. 239,464
Claims priority, application Japan, Sep. 14, 1978, 53-113122; European Pat. Off., Sep. 14, 1979, 79103455.6
Int. Cl.³ F16D *3/30*
U.S. Cl. 464—111 **14 Claims**



1. A tripod type constant velocity universal joint comprising:
a driving part having an axis of rotation;
a driven part having an axis of rotation;
a spider member, integral with one of said parts, having a concentrated portion and three roller supporting rods extended radially from said concentrated portion thereof with an angle of 120 degrees formed therebetween;
three roller elements respectively rotatably supported on said roller supporting rods and slidable along said roller supporting rods in the axial directions of said rods; and
a pot member, integral with the other of said parts, defining three pairs of longitudinal roller raceways and respectively receiving said three roller elements between said pairs of roller raceways, each pair of roller raceways having a top end side and a base side with a central portion therebetween along a longitudinal axis thereof,
said longitudinal axis of said each pair of roller raceways having an internal surface approaching, along straight lines, a rotational axis of said pot member on both of said top end side and said base side, and the distances R be-

tween the longitudinal axis of said each pair of roller raceways and the rotational axis of said pot member on said both sides being shorter than the distance R_o therebetween at said central portion thereof, and

said longitudinal axis of said each pair of roller raceways being symmetrically configured with respect to a central point in said central portion of each said pair of roller raceways in their longitudinal direction, said central point being a symmetry point,

whereby an approach quantity δ of the longitudinal axis of said roller raceways, defined by the difference between said distances Ro and R at both ends thereof, with respect to the rotational axis of said pot member, and the variation of the approach quantity in response to the position of said roller elements moving in the longitudinal axis of said roller raceways, are decreased by said straight lines, thereby decreasing the quantity of nonconstant rotational velocity thereof and decreasing the length thereof in their longitudinal direction to reduce the size and weight thereof.

4,421,495

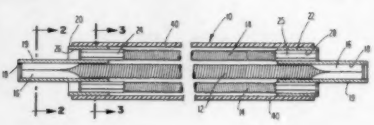
BALANCED COMPOSITE FLEXIBLE SHAFT ASSEMBLY CAPABLE OF OPERATING IN A TIGHT RADIUS

Walter Kulischenko, East Brunswick, N.J., assignor to Pennwalt Corporation, Philadelphia, Pa.

Filed Mar. 22, 1982, Ser. No. 360,544

Int. Cl.³ F16D 3/66

U.S. Cl. 464—51 **15 Claims**



1. An assembly of flexible shafts including a central flexible shaft and outer flexible shafts rotating in a tight radius of curvature while transmitting high torques comprising:

a pair of end fittings each of which receives one end of each of said flexible shafts, each of said end fittings having an axial bore therethrough and a plurality of outer bores disposed symmetrically around said axial bore,

said central flexible shaft having each end thereof affixed within one of said axial bores,

said outer flexible shafts having their ends received within said outer bores to provide substantially symmetrical disposition of said outer flexible shafts about said central flexible shaft along entire length thereof, and

means for rotating said assembly in said tight radius wherein said outer flexible shafts free float in at least one of said end fittings while rotating to thereby maintain said substantially symmetrical disposition of said shafts.

4,421,496

DRIVE COUPLING

Reginald S. Emerson, 34 Highlands Rd., and Norman Morris, 21 Poplars Rd., both of Buckingham, Buckinghamshire, England

Continuation of Ser. No. 162,663, Jun. 24, 1980, abandoned. This application Jul. 16, 1982, Ser. No. 399,191

Claims priority, application United Kingdom, Jun. 29, 1979, 7922650

Int. Cl.³ F16D 3/50

U.S. Cl. 464—95 **4 Claims**

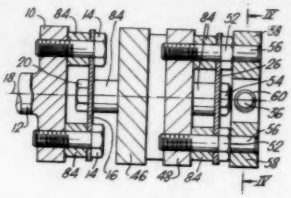
1. A drive coupling for connecting a drive shaft to a driven shaft, said coupling being constructed to lie in an axial gap between the two shafts and comprising:

(a) a first flexible disc connected by a first pair of connecting bolts to means on one of said shafts;

(b) a first solid member spaced from said first flexible disc and connected thereby to a second pair of connecting bolts, said second pair of connecting bolts being at different angular positions to said first flexible disc with respect to said first pair of connecting bolts, and said first solid member having a transversely-extending groove therein;

(c) a second flexible disc spaced from said first solid member and connected thereto by a third pair of connecting bolts, said third pair of connecting bolts being at the same angular positions as said second pair of connecting bolts, and said second flexible disc being disposed on that side of said first solid member remote from said first flexible disc;

(d) a second solid member spaced from said second flexible disc and connected thereto by a fourth pair of connecting



bolts, said fourth pair of connecting bolts being at the same angular positions as said first pair of connecting bolts, and said second solid member being shaped as a bar which is received within said transversely-extending groove of said first solid member to permit sufficient relative movement between said first and second solid members to allow said flexible discs to flex; and

(e) a pair of jaws connected to said fourth pair of connecting bolts on that side of said second flexible disc remote from said second solid member, said pair of jaws being adapted to clamp onto dogs associated with the other one of said two shafts.

4,421,497

FIBER-REINFORCED DRIVE SHAFT

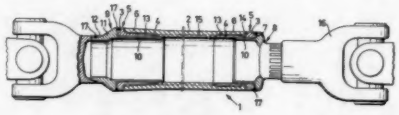
Helmut Federmann, Bergisch Gladbach, and Joachim Bausch, Duerscheid, both of Fed. Rep. of Germany, assignors to Felten & Guilleaume Energietechnik GmbH, Cologne, Fed. Rep. of Germany

Filed Nov. 3, 1980, Ser. No. 203,669

Claims priority, application Fed. Rep. of Germany, Nov. 17, 1979, 2946530

Int. Cl.³ F16C 3/00, 3/16

U.S. Cl. 464—181 **10 Claims**

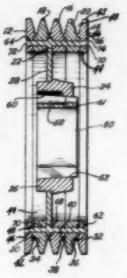


1. Drive shaft, particularly for motor vehicles, comprising a tubular shaft composed of fiber-reinforced synthetic plastic resin and including a plurality of wound layers of resin-impregnated fibers, with the windings of the inner and outer layers being helical and having a low pitch, but for intermediate layers with a pitch angle of about 30°–60° and with the windings of successive layers crossing one another; a metallic end pieces at each axial end of said tubular shaft and having a smaller-diameter inner anchoring portion received in the respective axial end and bonded thereto, and a larger-diameter outer ring portion of one piece with the anchoring portion, said ring portion having an axial end face facing toward and bonded to the adjacent end faces of said tubular shaft so as to protect the same against ambient influences.

4,421,498
MODULAR SHEAVE

Robert P. DeLeu, Mishawaka, and Robert G. Thompson, Osceola, both of Ind., assignors to Reliance Electric Company, Mishawaka, Ind.

Filed May 13, 1981, Ser. No. 263,301
Int. Cl.³ F16H 55/36
U.S. Cl. 474—182 14 Claims



1. A modular V-belt sheave comprising two end modules of similar shape and construction, each module having a plurality of holes for alignment with corresponding holes in the other end module and having at least one angular peripheral surface for engagement with a belt, at least one intermediate module having a plurality of holes for alignment with the holes in said end modules and having two angular annular peripheral surfaces for engagement with belts on opposite sides thereof, a hub having a cylindrical body with an outer surface defined by an outer diameter and a radial means joined to said outer surface of said body and extending outwardly therefrom for connection with at least one of said modules, said end modules being defined by an outer wall, an inner wall and a pair of side walls, said inner wall having a diameter sufficiently larger than the outer diameter of said body of said hub wherein the inner wall is radially spaced outwardly of said outer surface of said body and tying means having members extending through the holes in said modules for securing said modules together in axial alignment with one another and in supported relationship with said radial means of said hub.

4,421,499
TUBE FORMING SHOE AND METHOD OF FORMING A FLEXIBLE WEB INTO A SHOE

Peter Kuipers, Taylors, S.C., assignor to Nordson Corporation, Amherst, Ohio

Continuation of Ser. No. 85,044, Oct. 15, 1979, Pat. No. 4,295,322. This application Jul. 20, 1981, Ser. No. 285,435
The portion of the term of this patent subsequent to Oct. 20, 1998, has been disclaimed.
Int. Cl.³ B31B 1/38
U.S. Cl. 493—23 8 Claims

1. A method of forming a flat flexible film web into a tube-shaped film having a longitudinal seam, said method including the steps of:

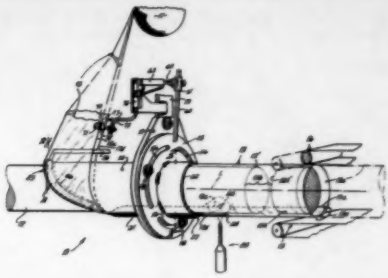
introducing said web to one end of a rotatable tube forming shoe at an angle with respect to a longitudinal rotational axis of said shoe,

bending said film around a curved brake edge of said shoe,

drawing said film across said brake edge of said shoe and guiding said film into a tubular shape while pulling said film through said shoe,

blowing fluid from said edge against said film to hold said film away from said brake edge as said film is bent around said brake edge and pulled through said shoe, and

including the further step of sensing changes of position of an edge of said film prior to said bending and rotating said

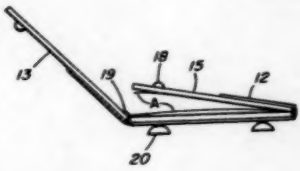


shoe in response to the change of position of said edge to adjust film position in said shoe.

4,421,500
MANUALLY OPERABLE FOLDING GUIDE

Samuel C. Smith, 210 Hartman Rd., Newton Centre, Mass. 02159

Filed Jul. 6, 1982, Ser. No. 395,280
Int. Cl.³ B65H 45/00
U.S. Cl. 493—405 9 Claims



1. A folder assembly for an elongated work-piece comprising a relatively flat and rigid panel provided with at least one straight edge and at least one self-retractable flap provided with a matching straight edge located along the straight edge of the panel and elastic means hingedly connecting the flap to the panel across the matching straight edges, including an elastic sheet material secured to a back surface of the flap and panel wherein the work-piece is folded along the matching straight edges and the elastic sheet provides both a hinge and a spring action.

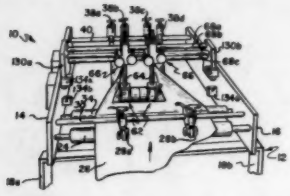
4,421,501
WEB FOLDING APPARATUS

Bruce A. Scheffer, 3819 W. 90th Ct., Merrillville, Ind. 46410

Filed Jan. 18, 1982, Ser. No. 340,421
Int. Cl.³ B65H 45/22
U.S. Cl. 493—439 33 Claims

1. In apparatus for folding web material which includes a frame, an entrance roller supported by said frame transversely thereof, an exit roller supported by said frame in parallel spaced relation from said entrance roller, and a plow folder supported intermediate said entrance and exit rollers and cooperative therewith to effect longitudinal folding of web material moved longitudinally from said entrance roller to said exit roller, the improvement wherein said plow folder includes a fold forming member having its longitudinal axis oriented substantially normal to the direction of web movement and having a cylindrical outer peripheral surface portion, said forming member having an end thereof formed by an axially

outwardly facing generally planar fold surface lying in a plane subtending an acute angle with a plane transverse and normal to the longitudinal axis of said fold forming member, said fold forming member being cooperative with the web material so as to effect folding thereof at the area of intersection of said



cylindrical surface portion with said fold surface as said web material is passed from said entrance to said exit rollers, said fold surface being operative to limit the extent of folding of said web material at said fold forming member during longitudinal movement of said web material.

4,421,502

WORM CENTRIFUGE

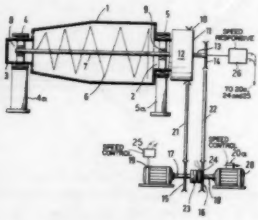
Willy Jakobs, Cologne, Fed. Rep. of Germany, assignor to Klockner-Humboldt-Deutz AG, Fed. Rep. of Germany

Filed Jan. 28, 1982, Ser. No. 343,403

Claims priority, application Fed. Rep. of Germany, Jan. 30, 1981, 3103029

Int. Cl.³ B04F *9/02*

U.S. Cl. 494—7 **10 Claims**



1. A worm-type centrifuge comprising in combination:

a rotatably mounted drum for containing material to be centrifuged;

a conveying screw rotatably mounted within the drum for coacting with the drum in processing of said material;

first and second drives respectively connected to drive the drum and the screw in rotation;

first and second power means respectively connected to drive said first and second drives;

and releasable clutch means located between the power means for interconnecting the power means and drives to drive the screw and drum in unison at start-up and for being disconnected for independent driving of the drum and screw during normal operation.

4,421,503

FLUID PROCESSING CENTRIFUGE AND APPARATUS THEREOF

Allen Latham, Jr., Jamaica Plain, and Donald W. Schoendorfer, Brookline, both of Mass., assignors to Haemonetics Corporation, Braintree, Mass.

Filed Jul. 9, 1981, Ser. No. 281,655

Int. Cl.³ B04B *5/00*

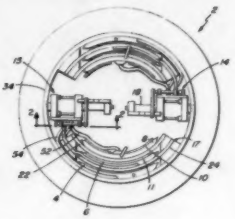
U.S. Cl. 494—17 **39 Claims**

1. Apparatus for processing fluids in a centrifugal force field to separate constituent components of such fluids comprising in combination:

(a) a centrifuge having a rotor adapted to rotate at a sufficient speed to cause said components to separate;

(b) a flexible bag adapted to contain a first fluid;

(c) a receiver container adapted to receive at least one component of said first fluid;



(d) mass means disposed nearer the center of rotation of the rotor than the flexible bag and adapted to move and contact a surface of said bag, said mass being sufficient to at least initiate a flow from said bag to said container of component fluid separated in said bag.

4,421,504

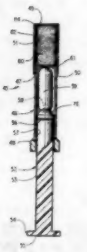
LUBRICATING OBJECT INJECTOR UTILIZING A SINGLE PLUNGER

Larry H. Kline, 18 Broad St., Suite 805, Charleston, S.C. 29401

Continuation-in-part of Ser. No. 300,028, Sep. 8, 1981, Pat. No. 4,341,211. This application Jul. 21, 1982, Ser. No. 400,468

Int. Cl.³ A61F *13/20*

U.S. Cl. 604—12 **41 Claims**



1. A device for placing an object into a body cavity comprising:

a. an applicator body comprising an elongated body within which said object is placed, said elongated body having a plurality of fixed first openings, with continuous outer perimeters which are open to said applicator body and to the exterior of said elongated body, and through which said exterior of said elongated body may be lubricated by a lubricating material placed within said applicator body in said elongated body;

b. lubricating means moveably secured within said applicator body; and

c. movement means, moveably secured within said applicator body, sized and shaped to fit within said applicator body, wherein said movement means may move said object out of said applicator body when said device is utilized, said movement means and said lubricating means comprising a single plunger,

whereby when said device is placed within said body cavity, said object may be moved into said body cavity.

4,421,505
WOUND IRRIGATION SYSTEM

Nathan H. Schwartz, 2205 Haverhill Ct., Marietta, Ga. 30067

Continuation-in-part of Ser. No. 345,003, Feb. 2, 1982. This application May 20, 1982, Ser. No. 380,108
Int. Cl.³ A61M 1/00
U.S. Cl. 604—28 9 Claims

1. A method of irrigating a wound in a body part with a treatment fluid comprising the steps of:

placing a plurality of pieces of tubing in the body part, each of said pieces of tubing having a perforated section therein so that all of the perforated sections are located in the vicinity of the wound in the body part to be irrigated with the perforated section of each piece of tubing being shifted axially with respect to the perforated sections in the other pieces of tubing and with opposite ends of each piece of tubing projecting out of the body part;

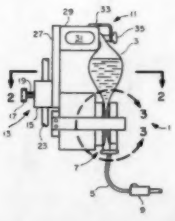
connecting one end of each of the pieces of tubing to a source of treatment fluid so that the pieces of tubing are connected to the source of treatment fluid in parallel with each other and so that the treatment fluid passes through the pieces of tubing into the body part and is discharged into the wound through the perforated sections; and

connecting the opposite ends of the pieces of tubing to a vacuum source so that the pieces of tubing are connected to the vacuum source in parallel with each other and so that the vacuum is imposed through the pieces of tubing on the treatment fluid passing into the body part through the pieces of tubing and through the perforated sections on fluids in the body part surrounding the perforated sections in the pieces of tubing.

4,421,506
FLOW-REGULATING ENTERIC FEEDING PUMP

Hal C. Danby, Palo Alto, and Carl Ritson, San Jose, both of Calif., assignors to Anatros Corporation, San Jose, Calif.

Filed Jan. 8, 1982, Ser. No. 338,012
Int. Cl.³ A61M 5/00; F04B 43/08
U.S. Cl. 604—34 23 Claims



1. A flow-regulating pump for controlling the flow rate of fluid along a serial fluid flow path extending through said pump from a reservoir located above said pump at the upstream end of said flow path, especially for use in an apparatus for administering a fluid internally to the human body for the purpose of enteric feeding, said fluid flow path being bounded over a certain region therealong by generally thin flexible walls, said flow-regulating pump comprising:

pump frame means to engage and support said reservoir above said region bounded by flexible walls;

first occlusion means to compress said flexible walls together to occlude said flow path within a first region extending transversely thereacross, said occlusion means being selectively operable between a closed position in which said first region is fully occluded and an open position in which said first region is at least partially unoccluded;

second occlusion means to compress said flexible walls together to occlude said flow path within a second region extending transversely thereacross, said second region being adjacent to said first region but spaced therefrom in a direction toward said reservoir to define between said first and second regions an unoccluded pumping region, said second occlusion means being selectively operable between a closed position in which said second region is fully occluded and an open position in which said second region is at least partially unoccluded; and,

pump actuating means to sequentially operate said first and second occlusion means in the following cycle: occlude first region, open second region, occlude second region, open first region, said pump actuating means including pumping means to compress said pumping region to express any fluid contained therein, and;

means to produce a first higher pressure within said second region when closed, and means to produce a second lower pressure within said first region following the closure of said second region and prior to the opening of said first region, wherein said pumping means compresses said pumping region sufficiently to overcome said second lower pressure and open said first region.

4,421,507
PLUG-TYPE FLUID ACCESS DEVICES

Jack C. Bokros, Austin, Tex., assignor to Carbomedics, Inc., Austin, Tex.

Continuation-in-part of Ser. No. 220,101, Dec. 24, 1980, abandoned. This application Nov. 23, 1981, Ser. No. 324,040
Int. Cl.³ A61M 5/00
U.S. Cl. 604—52 20 Claims

1. In combination a device to provide access to a fluid-containing internal region of a living body, a plug and an adaptor;

said device comprising an access tube providing a first passageway for communication with the internal region and means to anchor said tube in the living body, said access tube having an outer end which is proportioned to extend above the skin when said device is anchored in the living body;

said plug being proportioned to be received in said access tube and including an inner sealing member which blocks said first passageway and an outer portion which provide a surrounding vacant region within said first passageway, whereby surfaces of said access tube outward of said sealing member can be washed by injecting a cleaning solution into said vacant region when said plug is blocking said first passageway;

said adaptor comprising a tubular section providing a second passageway for alignment with said first passageway and a chamber portion for receiving said plug when it is withdrawn from said access tube, connecting means for joining one end of said adaptor to said outer end of said access

tube, and side passageway means in communication with said second passageway and located between said one end of said adaptor and said chamber portion through which fluid can flow when said plug is withdrawn from said first passageway and located in said chamber portion.

4,421,508

VACUUM-COMPRESSION INJECTOR

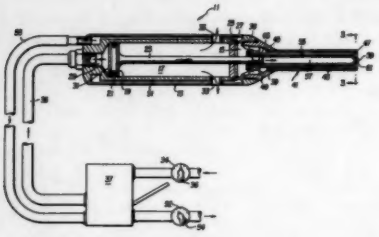
Edgar C. Cohen, 4123 Vincennes Pl., New Orleans, La. 70125

Continuation-in-part of Ser. No. 237,563, Feb. 24, 1981. This application Jul. 8, 1981, Ser. No. 281,436

The portion of the term of this patent subsequent to Sep. 13, 2000, has been disclaimed.

Int. Cl.³ A61M *5/30*

U.S. Cl. 604—70 **12 Claims**



1. A needleless vacuum-compression injector comprising:

a continuous vacuum chamber and a pressurized gas chamber;

means for drawing a continuous vacuum in said vacuum chamber;

means for supplying pressurized gas to said pressurized gas chamber;

means for holding a medicament;

a nozzle having a passageway connected to said means for holding said medicament and for having said medicament expressed therethrough;

tissue immobilizing means including an an outwardly extending surface spaced from and surrounding said nozzle wherein said nozzle substantially terminates in the plane of said surface;

said tissue immobilizing means further including an annular suction means formed in an annular region of said outwardly extending surface and spaced from and surrounding said nozzle, said annular suction means being in continuous communication with said vacuum chamber, said tissue immobilizing means, when positioned against said tissue, being operative to continuously draw said tissue toward said annular region and thereby immobilize and hold said tissue taut over said nozzle without puncturing said tissue and without substantially displacing said tissue from its initial condition;

means adapted to express said medicament through said passageway and into said tissue upon application of said pressurized gas to said pressurized gas chamber; and,

wherein said outwardly extending surface is non-circular shaped.

4,421,509

LEG BAG FOR URINARY INCONTINENCE

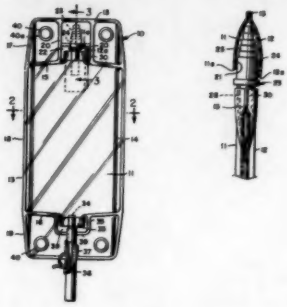
Barry L. Schneider, Deerfield, and David V. Beddow, Lake Villa, both of Ill., assignors to Hollister Incorporated, Libertyville, Ill.

Filed Jun. 15, 1981, Ser. No. 273,363

Int. Cl.³ A61M *1/00*

U.S. Cl. 604—317 **22 Claims**

1. A generally flat, elongated, expandable bag formed of flexible thermoplastic material and adapted to be secured to a patient's leg for the collection of urine with the longitudinal axis of said elongated bag normally disposed vertically; said bag having inner and outer walls that are peripherally joined together and are generally parallel when the bag is empty; said bag also having upper, central, and lower sections; said inner and outer walls being provided with aligned openings together defining an aperture extending through said upper section immediately above said central section and being sealed together along a transverse seal line across said bag and defining the lower limits of said aperture; an inlet tube secured to said



bag along said transverse seal line and communicating with the interior of said central section below said aperture; said inlet tube including an elongated inlet nozzle projecting upwardly into and beyond said aperture and overlying the outer wall of said upper section; said inlet nozzle being adapted for connection to a urinary drainage tube; and a pair of laterally-spaced fasteners provided by each of said upper and lower sections; said pair of fasteners of said upper section being located above said transverse seal line.

4,421,510

URINE DRAINAGE DEVICE PERMITTING TRAINING OF THE BLADDER

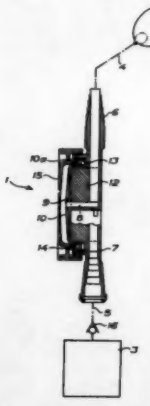
Stig G. Ahlbeck, Västanväg 28, S-213 16 Malmö, Sweden

PCT No. PCT/SE80/00013, § 371 Date Sep. 18, 1980, § 102(e) Date Sep. 18, 1980, PCT Pub. No. WO80/01454, PCT Pub. Date Jul. 24, 1980

PCT Filed Jan. 17, 1980, Ser. No. 204,371

Int. Cl.³ A61M *1/00*

U.S. Cl. 604—323 **11 Claims**



1. For use in a urine drainage device which includes a cathe-

ter insertable into a bladder and a collection bag in fluid communication with the catheter, a valve for bladder control adapted to be interposed to the fluid communication path between the catheter and the collection bag, said valve comprising:

(i) a housing having an inlet adapted to communicate with the bladder and an outlet adapted to communicate with the collection bag;

(ii) a closure element mounted to said housing; and

(iii) means for pulling said closure element taut over said inlet to resiliently seal said inlet, said closure element being movable between a first position in which said inlet is closed by said closure element and a second position in which said inlet and said outlet are in fluid communication, wherein said closure element has a first fluid contacting surface area responsive to fluid pressure in the bladder when in said first position and a second fluid contacting surface area responsive to fluid pressure in the bladder when in said second position, said second fluid contacting surface area being substantially greater than said first fluid contacting surface area, such that the bladder fluid pressure required to maintain said closure element in said second position is substantially less than the bladder fluid pressure required to move said closure element from said first position to said second position.

4,421,511

FEMALE INCONTINENCE DEVICE

Peter L. Steer, and John V. Edwards, both of East Grinstead, England, assignors to Craig Medical Products Limited, Sussex, England

Filed Feb. 25, 1981, Ser. No. 238,189

Claims priority, application United Kingdom, Mar. 6, 1980, 8007738; Oct. 15, 1980, 8033222

Int. Cl.³ A61F 5/44

U.S. Cl. 604—329 **4 Claims**

1. A female incontinence device comprising an external resilient pad having a peripheral portion in the form of a hollow tube, said tube filled with a liquid silicone fluid, the tube being designed to make sealing engagement with that portion of the user's anatomy which is external to the labia majora, a mount forming part of the pad, and a funnel carried by the mount and shaped and dimensioned so that a rim thereof can engage that portion of the user's anatomy which immediately surrounds the meatus of the urethra.

4,421,512

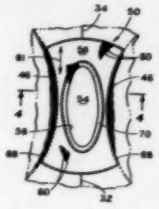
PANTYHOSE WITH SANITARY NAPKIN HOLDER

Elissa D. Papajohn, 65 Montague St., Brooklyn, N.Y. 11201

Filed Nov. 23, 1981, Ser. No. 323,915

Int. Cl.³ A61F 13/16

U.S. Cl. 604—396 **1 Claim**



1. In combination, a pantyhose comprised of a panty having a front, rear and opposite sides cooperating to define a lower torso garment having a waist opening and edges bounding right and left leg openings and of left and right leg-receiving stockings respectively attached as extensions from said right and left leg openings, elastomeric yarns secured along said waist and leg openings to urge edges bounding the latter into gripping contact with the user's legs to contribute to an optimum sealed confinement for a sanitary napkin during wearing service of such pantyhose, and a sanitary napkin compartment formed of plies of fluid-tight material disposed in facing, superposed relation to each other in the crotch area of said pantyhose, the upper ply of said compartment being oriented to extend between the front and rear of said portion of said pantyhose and in substantial spanning relation between said elastomeric yarns bounding said leg openings, said compartment upper ply being further adapted to receive thereunder as a sanitary napkin a fluid absorbent material that is exposed to the interior of said panty portion of said pantyhose and having an oblong edge bounding an opening therein extending for a substantial portion of the length of said compartment and for a width of said compartment sufficient to receive fluids discharged from the body of the user without side leakage from said compartment, said compartment upper ply being constructed of elastomeric yarns oriented substantially parallel to the elastomeric yarns of said leg openings and having a nonstretchable strip secured about said oblong edge thereof so as to retain the sides of said compartment upper ply about the absorbent material in said compartment without adverse effect on said seal of said elastized leg openings, said panty portion of said pantyhose supporting said compartment in position on the user such that the opening is restrained from movement relative to the body so that the compartment opening will remain in position to enable the absorbent material to receive the discharged body fluids.

4,421,513
PROCESS FOR PRODUCING FIBRILLATED POLYESTER

Su Tien-Kuei, Spartanburg, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

Division of Ser. No. 1,993, Jan. 8, 1979, Pat. No. 4,331,724, which is a continuation-in-part of Ser. No. 907,920, May 22, 1978, abandoned. This application Oct. 2, 1981, Ser. No. 307,993

Int. Cl.³ D06M *5/12*

U.S. Cl. 8—130.1 **6 Claims**

1. A process for producing a fibrillated polyester textile formed of a plurality of polyester filaments in which said filaments have a curvature to provide a convex side portion and a concave side portion and the fibrillation occurs at the convex side portion of said filament extending away from the body portion of said textile material comprising the steps of:

swelling a polyester filament by immersion of a polyester textile material containing said filament in a liquid polyester swelling agent; and,

ultrasonically agitating said liquid polyester swelling agent while said polyester textile material is immersed therein, for an effective amount of time and at an effective power to fibrillate said polyester filament.

4,421,514
ANTISTATIC LAUNDRY TREATMENT

Robert A. Bauman, New Brunswick, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Aug. 3, 1982, Ser. No. 404,721

Int. Cl.³ D06M *13/20;* **B08B** *3/04, 3/08*

U.S. Cl. 8—137 **7 Claims**

1. A method of imparting antistatic properties to fabrics during laundering, which comprises separately adding an antistatic amount of isostearic acid to the wash water containing a nonionic detergent at a maximum pH of about 8.

4,421,515
PRINTING PROCESS

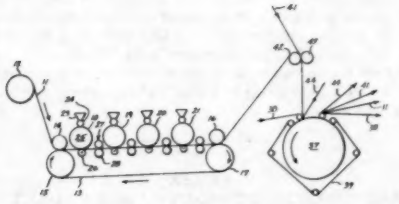
Emery J. Gorondy, Chadds Ford, Pa., assignor to E.I. Du Pont de Nemours & Co., Wilmington, Del.

Filed Jun. 28, 1982, Ser. No. 392,787

The portion of the term of this patent subsequent to Dec. 20, 2000, has been disclaimed.

Int. Cl.³ D06P *5/20*

U.S. Cl. 8—444 **7 Claims**



1. A process for dyeing a disperse dyeable textile material comprising the steps of:

forming a latent magnetic image in a magnetic imaging member comprising a ferromagnetic material imposed on an electrically conductive support;

developing the latent magnetic image by applying thereto a ferromagnetic toner comprising a ferromagnetic component, a dye component containing a dye that is substantially sublimable from 160° C. to 215° C., and a resin which is substantially encapsulates the ferromagnetic component and the dye component;

transferring the developed image from the magnetic imaging member to a first surface of a thermally stable, sublimable-dye-permeable first polymeric film;

covering the image with a layer of a material,

bringing said polymeric film into contact on a second surface thereof with the disperse dyeable textile material to be dyed, such that the developed image on the first surface of the polymeric film is on the opposite side of the polymeric film from the second surface in contact with the disperse dyeable textile material;

heating the disperse dyeable textile material and the polymeric film to cause substantial sublimation of the dye of said dye component, thereby transferring said dye image from the first surface of the polymeric film through the polymeric film to form a dye image on the disperse dyeable textile material.

4,421,516
PROCESS FOR PREPARING DISCHARGE RESIST PRINTS ON HYDROPHOBIC TEXTILE MATERIALS

Theo Stahl, Frankfurt am Main, and Ulrich Bühler, Schöneck, both of Fed. Rep. of Germany, assignors to Cassella Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Mar. 10, 1983, Ser. No. 473,783

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1982, 3209327

Int. Cl.³ D06P *5/15*

U.S. Cl. 8—464 **16 Claims**

1. In the process for preparing discharge prints on textile materials containing hydrophobic fibers wherein at least one disperse dyestuff dischargeable to white is applied to the textile material in the form of a dyeing liquor or print paste and is also contacted by a pattern-applied discharge resist print paste, and then the material is heat treated at 100° to 230° C., the improvement comprises said discharge resist print paste having under the heat treatment conditions a pH value of zero to 3.

4,421,517
PRINTING PROCESS

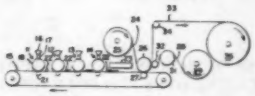
Emery J. Gorondy, Chadds Ford, Pa., assignor to E. I. Du Pont de Nemours & Co., Wilmington, Del.

Filed Jun. 28, 1982, Ser. No. 392,783

The portion of the term of this patent subsequent to Dec. 20, 2000, has been disclaimed.

Int. Cl.³ D06P *5/20*

U.S. Cl. 8—471 **9 Claims**



1. A process for printing a disperse dyeable textile material with a dye comprising the steps of:

forming a latent magnetic image in a magnetic imaging member comprising a ferromagnetic material on an electrically conductive support;

developing the latent magnetic image by applying a ferromagnetic toner comprising a ferromagnetic component, a dye component which is substantially sublimable at from 160° C. to 215° C., and a resin which substantially encapsulates the ferromagnetic component and the dye component;

transferring the developed image to a substrate comprising a continuous belt formed of thermally stable, dielectric, non-dye-receptive material;

transferring the developed image to a first film of a thermally stable resin which is permeable to said dye component by the application of heat and pressure;

applying a second polymeric film or paper web to the side of the first film bearing the image to form a laminate;

then bringing the laminate bearing the image into contact with a disperse dyeable textile material to be dyed while

the laminate and the disperse dyeable textile material are rotated upon a heated drum, with the disperse dyeable textile material facing the side of the first film which does not bear the image, to thereby transfer said dye component from the first film to the disperse dyeable textile material; and separating the disperse dyeable textile material from the laminate.

4,421,518

PRINTING PROCESS

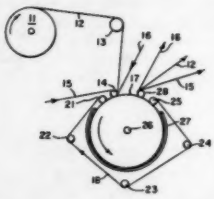
Emery J. Gorondy, Chadds Ford, Pa., assignor to E. I. Du Pont de Nemours & Co., Wilmington, Del.

Filed Jun. 28, 1982, Ser. No. 392,785

The portion of the term of this patent subsequent to Dec. 20, 2000, has been disclaimed.

Int. Cl.³ D06P *5/20*

U.S. Cl. 8—471 **9 Claims**



1. A process for printing a disperse dyeable textile material with a dye comprising the steps of:

forming an image comprising a dye component which is substantially sublimable at from 160° C. to 215° C. on a film of a thermally stable resin which is permeable to said dye component by the application of heat and pressure;

covering the side of the film bearing the image with a web of paper or a resinous material to form a laminate,

then bringing the laminate into contact with a disperse dyeable textile material to be dyed while the laminate and disperse dyeable textile material are rotated upon a heated drum, with the disperse dyeable textile material facing the side of the film in the laminate which does not bear the image, to thereby transfer said dye component through the film to the disperse dyeable material; and separating the disperse dyeable textile material from the laminate.

4,421,519

MIXTURES OF CATIONIC DYES: NAPHTHO-LACTAM AND OXAZINE DYES FOR POLYACRYLONITRILES

Peter Loew, Münchenstein, and Rudolf Zink, Therwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

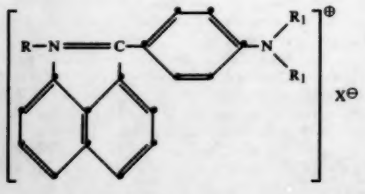
Filed Jun. 7, 1982, Ser. No. 385,596

Claims priority, application Switzerland, Jun. 16, 1981, 3957/81

Int. Cl.³ D06P *3/76;* **C09B** *57/06*

U.S. Cl. 8—644 **16 Claims**

1. A process for dyeing and printing polyacrylonitrile materials or mixed fabrics containing polyacrylonitrile materials, in which process there is used a mixture of the dyes of the formula I and II or Ia and II



(I)

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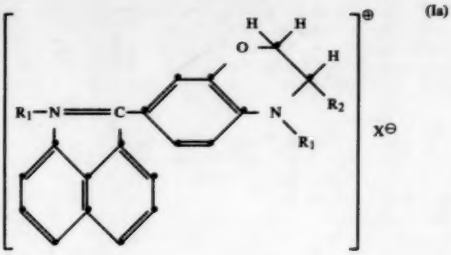
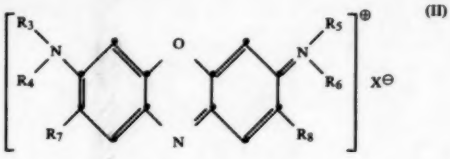


(Ia)



(II)

wherein

R is a C_1-C_4-alkyl group, which is substituted by CN, COO-alkyl-C_1-C_4, $CONH_2$, CONH(alkyl-C_1-C_4) or CON(alkyl-C_1-C_4)$_2$;

R_1's independently of one another are each an unsubstituted C_1-C_4-alkyl group or a C_1-C_4-alkyl group which is substituted by CN, OH, C_1-C_4-alkoxy, COO-alkyl-C_1-C_4, $CONH_2$, CONH(alkyl-C_1-C_4), CON(alkyl-C_1-C_4)$_2$, or the two R_1's in the formula I form together with the N atom a heterocyclic 5- or 6-membered ring;

R_2 is hydrogen, an unsubstituted or substituted C_1-C_4-alkyl group, or an unsubstituted or substituted aryl group;

R_3 and R_5 independently of one another are each hydrogen, a C_1-C_4-alkyl group, which is unsubstituted or substituted by CN, OH, aryl, halogen or a C_1-C_4-alkoxy group, or an alkenyl group having 3 or 4 carbon atoms;

R_4 and R_6 independently of one another are each a C_1-C_4-alkyl group, which is unsubstituted or substituted by CN, OH, aryl, halogen or a C_1-C_4-alkoxy group, or are an alkenyl group having 3 or 4 carbon atoms, or R_4 and R_6 independently of one another are each an unsubstituted phenyl group, or a phenyl group which may be substituted by a C_1-C_4-alkyl group, by a C_1-C_4-alkoxy group or by halogen, and R_6 can moreover be hydrogen;

R_7 and R_8 independently of one another are each hydrogen, a C_1-C_4-alkyl group or a C_1-C_4-alkoxy group, and

X is an anion.

4,421,520

REDUCING THE TENDENCY OF DRIED COAL TO SPONTANEOUSLY IGNITE

J. David Matthews, Denver, Colo., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Dec. 21, 1981, Ser. No. 333,146

Int. Cl.³ C10L *5/24, 5/32*

U.S. Cl. 44—6 **6 Claims**

1. In a method for producing a dried particulate coal fuel having a reduced tendency to spontaneously ignite wherein crushed mined coal is heated in a drying zone with a hot gas to vaporize water from the coal and dry the coal to a moisture content of less than about 20 percent by weight of water and wherein the dried coal is removed from said drying zone, the improvement comprising contacting and intimately mixing said removed dried coal particles with a water-base dispersion comprised of water and latex paint type solids, whereby an elastic film is formed on said dried coal particles.

4,421,521
PROCESS FOR AGGLOMERATING CARBON PARTICLES

James C. Barber, Florence, Ala., assignor to James C. Barber and Associates, Inc., Florence, Ala.

Division of Ser. No. 223,122, Jan. 7, 1981. This application Sep. 8, 1981, Ser. No. 299,969
Int. Cl.³ C10L 5/12, 5/40; C01B 25/01
U.S. Cl. 44—16 R 2 Claims

1. A process for agglomerating carbon particles for use as reducing carbon in phosphorus furnaces which comprises:
a. mixing reducing carbon particles of less than ¼ inch size with orthophosphoric sludge acid and water;
b. adding the mixture from (a) to a rotating cylinder;
c. ammoniating and tumbling said particles in the cylinder to thereby cause agglomeration;
d. indurating the agglomeration by heating to cause drying.

4,421,522
DIESEL FUEL COMPOSITION

Paul D. Seemuth, Oak Park, Mich., assignor to Ethyl Corporation, Richmond, Va.

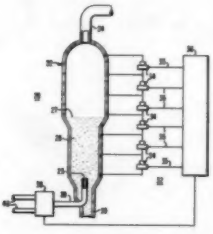
Filed Oct. 6, 1982, Ser. No. 433,160
Int. Cl.³ C10L 1/22
U.S. Cl. 44—53 5 Claims

1. Liquid fuel adapted for use in a diesel engine, said fuel being selected from the group consisting of liquid hydrocarbons of the diesel boiling range, alcohols and mixtures thereof, and said fuel containing a cetane number increasing amount of a fuel soluble 4-morpholine alkanol nitrate.

4,421,523
CONTROL OF BED HEIGHT IN A FLUIDIZED BED GASIFICATION SYSTEM

Gautam I. Mehta, Greensburg, and Lynn M. Rogers, Export, both of Pa., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 11, 1982, Ser. No. 377,231
Int. Cl.³ C10J 3/54
U.S. Cl. 48—197 R 6 Claims



1. A method for use in a fluidized bed apparatus comprising a vessel having a bottom, a first substance to be fluidized, a second substance for fluidizing said first substance in a fluidized bed within said vessel, said second substance being a fluid, said fluidized bed having an upper surface and a bed height within said vessel which is the vertical distance from the bottom of the vessel to said upper surface, a controlling means for controlling the flow of at least one of said first or second substance, said controlling means being regulatable by a signal, and a differential pressure detecting system, said system comprising a plurality of differential pressure detectors connected in series, each detector having a high pressure tap connected to said vessel and a low pressure tap connected to said vessel, and adjacent detectors having a common tap to said vessel which serves as said high pressure tap for one detector and said low pressure tap for an adjacent detector, said vessel tap connections for each detector defining a horizontal zone within said vessel corresponding to each said detector, said method for controlling said fluidized bed height comprising the steps of:
(a) determining the differential pressure sensed by each detector substantially simultaneously;
(b) repeating step (a), periodically;
(c) averaging periodically a predetermined number of the latest differential pressures determined for each of said detectors to compute an average differential pressure for each said zone;
(d) dividing each average differential pressure by the vertical distance in the vessel of each corresponding zone to calculate a fluidized bed density corresponding to each said zone;
(e) averaging continuously a predetermined number of the most recent fluidized bed densities calculated for each of said zones to obtain an average fluidized bed density for each said zone;
(f) disregarding any zones for which the most recently calculated average fluidized bed density was non-positive and reserving the zone closest to the bottom of said vessel which was also adjacent to a zone for which the most recently calculated average bed density was non-positive, and for all remaining zones, calculating a weighting factor for each zone by the formula:

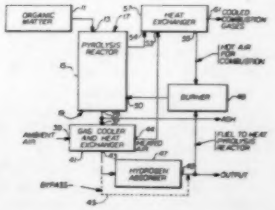
$$\text{Weight factor for zone } A = \frac{\text{Average bed density zone } B}{\text{Average bed density zone } A}$$

where zone A is adjacent to and above zone B;
(g) calculating the height of the bed within the reserved zone by dividing the fluidized bed density of the reserved zone by the fluidized bed density of the zone adjacent to and below the reserved zone, and multiplying by the vertical height of the reserved zone and the last weighting factor calculated for the reserved zone;
(h) producing said signal representative of said height of said bed within said reserved zone; and
(i) regulating said controlling means with said signal.

4,421,524
METHOD FOR CONVERTING ORGANIC MATERIAL INTO FUEL

Donald E. Chittick, Newberg, Oreg., assignor to Pyrenco, Inc., Prosser, Wash.

Continuation of Ser. No. 169,400, Jul. 16, 1980, abandoned, which is a continuation of Ser. No. 18,118, Mar. 7, 1979, Pat. No. 4,268,275. This application Feb. 4, 1982, Ser. No. 345,787
Int. Cl.³ C10J 3/00
U.S. Cl. 48—209 5 Claims



1. A process for converting organic material into a high quality fuel gas, wherein the process is carried out in a chamber which includes upper and lower adjacent vertical portions, the process comprising the steps of:
introducing an initial charge of charcoal, into the lower portion of the chamber;

heating the charcoal to a reaction temperature;

introducing organic material into the upper portion of the chamber after the charcoal has been heated to the reaction temperature, such that the lowermost portion of the organic material comes into contact with the uppermost portion of the heated charcoal;

decomposing the organic material by heating the organic material to a pyrolysis temperature within the range of 450 degrees C. and 750 degrees C., the resulting pyrolysis reaction being characterized by a lack of combustion sufficiently rapid to result in a flame, the products of the pyrolysis reaction consisting of char, and pyrolysis volatiles consisting of hydrogen, carbon monoxide, water vapor and tars;

decomposing the water vapor and tars to essentially pure hydrogen and essentially pure carbon monoxide by passing the water vapors and tars through the heated charcoal, wherein the reaction temperature of the charcoal is substantially higher than 700 degrees, and wherein the charcoal is arranged and maintained so that substantially all of the pyrolysis volatiles come into contact with the heated charcoal such that the gas exiting from the lower portion of the chamber comprises hydrogen and carbon monoxide with virtually no tars;

replenishing the organic material as it is consumed;

replacing the charcoal consumed during the process by the char produced by the pyrolysis reaction of the organic material in the upper portion of the chamber

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4,421,525
ALUMINA COATED COMPOSITE SILICON NITRIDE CUTTING TOOLS

Vinod K. Sarin, Lexington; Sergej-Tomislav Buljan, Acton, and Charles D'Angelo, Southboro, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed May 20, 1982, Ser. No. 380,379
Int. Cl.³ B24D *11/00*
U.S. Cl. 51—295 **13 Claims**

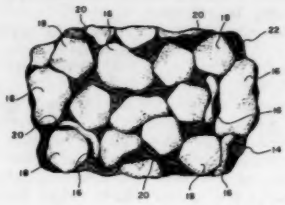
1. A coated composite ceramic cutting tool comprising a composite silicon nitride substrate body having at least one adherent coating layer; said substrate body consisting essentially of particles of a hard refractory material uniformly distributed in a matrix consisting essentially of a first phase of silicon nitride and a refractory second phase comprising silicon nitride and an effective amount of a densification aid selected from the group consisting of yttrium oxide, hafnium oxide, the lanthanide rare earth oxides, and mixtures thereof; said adherent coating layer consisting essentially of aluminum oxide.

4,421,526
POLYURETHANE FOAM CLEANING PADS AND A PROCESS FOR THEIR MANUFACTURE

Robert L. Strickman, and Melvyn B. Strickman, both of Bridgeton, N.J., assignors to Sherwood Research and Development Partnership, Englewood Cliffs, N.J.

Continuation-in-part of Ser. No. 305,870, Nov. 13, 1972, abandoned. This application Oct. 30, 1978, Ser. No. 955,877
Int. Cl.³ B29D *27/04*; C11D *17/04*; B24D *3/32*
U.S. Cl. 51—296 **22 Claims**

1. A dry synthetic resilient foamed polyurethane hydrophilic pad produced by reacting a prepolymer urethane resin and an aqueous catalyst mixture, the pad containing an additive selected from the group consisting of abrasives, water soluble detergents, and combinations thereof dispersed uniformly therein in the ratio of between 0.25 to 2.0 parts additive per part prepolymer, and having a densely structured polyurethane cellular matrix of 6 to 30 lbs./ft.³, said matrix comprised of abnormal and normal polyurethane cells, the matrix also containing fibrous polyurethane strands which are interwoven through the abnormal and normal cells as a consequence of the shear forces during mixing, said abnormal cells being ruptured, collapsed, swollen and distorted, said pad being produced by slowly mixing the resin and catalyst mixture to hinder foam formation, thereafter adding the additive and then further



mixing to form a uniform reacting mixture prior to allowing volumetric expansion of the mixture.

4,421,527
HIGH FLUORIDE COMPATIBILITY DENTIFRICE ABRASIVES AND COMPOSITIONS

Satish K. Wason, Churchville, Md., assignor to J. M. Huber Corporation, Locust, N.J.

Continuation of Ser. No. 862,384, Dec. 20, 1977, abandoned. This application May 23, 1979, Ser. No. 41,952
The portion of the term of this patent subsequent to Jan. 13, 1998, has been disclaimed.
Int. Cl.³ C04B *31/16*; C09C *1/68*
U.S. Cl. 51—308 **9 Claims**

1. An abrasive composition comprising a precipitated amorphous silicon dioxide prepared from a fresh water alkali metal silicate solution by acidulation, said silicon dioxide having been intimately reacted with a compound of an alkaline earth metal so as to have present therein and intimately associated therewith, about 10–300 parts per million of alkaline earth metal ions, said amorphous silicon dioxide exhibiting a Radioactive Dentin Abrasion value of at least 40, a pack density of about 0.24 to 0.55 grams per milliliter, an oil absorption of about 70–95 ccs/100 grams, a BET surface area of about 100–250 m^2/g, and a percent loss on ignition of about 4–6%, said abrasive composition, when incorporated into toothpaste compositions containing a fluoride therapeutic agent, providing a toothpaste composition which exhibits minimal loss of soluble fluoride upon storage at normal temperatures, and providing a fluoride compatibility value to the toothpaste of at least 90%.

4,421,528
PROCESS FOR MAKING A MODIFIED SILICON ALUMINUM OXYNITRIDE BASED COMPOSITE CUTTING TOOL

Sergej-Tomislav Buljan, Acton, and Vinod K. Sarin, Lexington, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed May 20, 1982, Ser. No. 380,361
Int. Cl.³ B24D *3/02*
U.S. Cl. 51—309 **20 Claims**

1. A process for obtaining an abrasion resistant cutting tool having a hard refractory material distributed in a homogeneous matrix containing a modified silicon aluminum oxynitride comprising:

mixing from about 20 to about 90 volume percent silicon nitride, from about 5 to about 60 volume percent aluminum oxide, and from about 20 to about 25 volume percent of a modifier to form a mixture;

reacting said mixture at a temperature from about 1400° C. to about 1800° C. for a period of time from about one to about eight hours in a non-oxidizing atmosphere to form a reacted mixture;

comminuting a blend comprising from about 40 to about 95 volume percent of said reacted mixture and from about 5 to

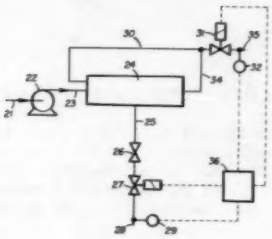
about 60 volume percent of a hard refractory material to form a composite blend; and

densifying said composite blend to form a homogeneous matrix of said reacted mixture having a dispersed phase of said hard refractory material throughout said homogeneous matrix, said densifying being sufficient to obtain a density greater than 98 percent of theoretical density of said composite blend.

4,421,529
MEMBRANE SYSTEM FOR INTERMITTENT GAS SEPARATION

Timothy T. Revak, and Robert T. Krueger, both of Concord, Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 2, 1982, Ser. No. 394,954
Int. Cl.³ B01D *53/22*
U.S. Cl. 55—16 **7 Claims**



1. In a process for separating gases from a mixture using a device containing a hollow fiber membrane preferentially permeable to at least one component of the gas mixture wherein the separation process is intermittent and the device is to be used in at least 1000 operating cycles separated by periods of non-use, the improvement wherein the pressure on the feed stream side of the membrane is maintained essentially constant or is varied relatively slowly during cycling between periods of non-use and initiation of gas separation such that after 1000 cycles of operation the selectivity of the membrane at the operating flow rate and other conditions of operation is at least 20 percent greater than that of an otherwise identical membrane which has been subjected to a pressure change of 75 psi in a period of 15 seconds at the start of each cycle of operation.

4,421,530
PROCESS FOR REMOVING OXYGEN FROM MIXED GAS STREAMS USING A SWING ADIABATIC ABSORPTION-ISOTHERMAL DESORPTION CYCLE

Augustine I. Dalton, Jr., Allentown, Pa.; John J. Sheridan, III, Somerville, N.J., and David A. Zagnoli, Fleetwood, Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Sep. 13, 1982, Ser. No. 417,296
Int. Cl.³ B01D *53/04*
U.S. Cl. 55—26 **11 Claims**

1. A process for removing oxygen from an inert gas stream containing oxygen by adiabatic absorption of the oxygen on a dioxygen absorbent and isothermal desorption of the oxygen during dioxygen absorbent regeneration wherein the process is designed to operate below the temperature of decomposition of the absorbent comprising the steps of:

(a) introducing an oxygen-containing inert gas stream into a first bed of a dioxygen absorbent at a temperature chosen on an isotherm of the particular dioxygen absorbent so as to allow adiabatic absorption to proceed without reaching the temperature of degradation of said absorbent;

(b) adiabatically absorbing essentially all of the oxygen content of said inert gas stream on said dioxygen absorbent, while removing an essentially oxygen-free inert gas from said bed;

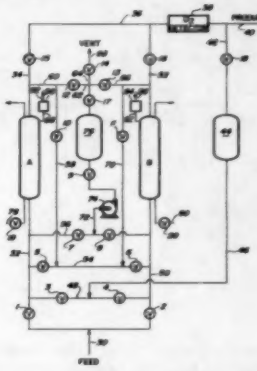
(c) terminating said absorption on said first bed before oxygen therethrough in said bed;

(d) switching the flow of the inert gas stream to a second dioxygen absorbent bed for adiabatic absorption of the oxygen content of said stream, while removing an essentially oxygen-free inert gas from said bed;

(e) desorbing said first bed isothermally by supplying a high temperature heat exchange fluid to said bed to drive absorbed oxygen off said dioxygen absorbent;

(f) cooling said first bed to the initial absorbent temperature;

(g) representing said first bed with essentially pure oxygen-



free inert gas from the downstream flow of product gas from said second bed;

(h) terminating said absorption on said second bed before oxygen breakthrough in said bed;

(i) switching the flow of the inert gas stream back to the first bed, while desorbing the second bed as described in step (e) above;

(j) cooling said second bed to the initial absorbent temperature;

(k) repressurizing the second bed with essentially pure oxygen-free inert gas from the downstream flow of product gas from said first bed;

(l) cyclically repeating steps (a) through (k) for the production of an essentially oxygen-free inert gas.

4,421,531
ADIABATIC PRESSURE SWING ABSORPTION PROCESS FOR REMOVING LOW CONCENTRATIONS OF OXYGEN FROM MIXED GAS STREAMS

Augustine I. Dalton, Jr., Allentown, Pa.; John J. Sheridan, III, Somerville, N.J., and David A. Zagnoli, Fleetwood, Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Sep. 13, 1982, Ser. No. 417,297
Int. Cl.³ B01D *53/04*
U.S. Cl. 55—26 **19 Claims**

1. A process for removing oxygen from an oxygen-containing inert gas stream by absorption of the oxygen into a dioxygen absorbent in an adiabatic pressure swing absorption process wherein the process is designed to operate below the temperature of decomposition of the absorbent, comprising the steps of:

(a) introducing an oxygen-containing inert gas stream into a first bed of a dioxygen absorbent at a temperature on the isotherm of the particular absorbent which will allow for adiabatic absorption without degradation of the absorbent;

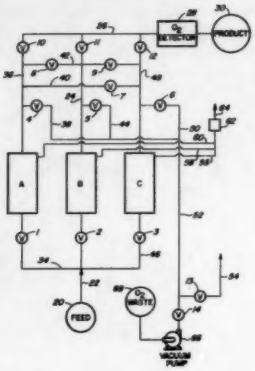
(b) adiabatically absorbing the oxygen content of said insert

gas stream of said dioxygen absorbent, while removing an essentially oxygen-free inert gas from said bed;

(c) terminating said absorption on said first bed before oxygen breakthrough in said bed;

(d) switching the flow of the inert gas stream to a second dioxygen absorbent bed for adiabatic absorption of the oxygen content of said stream while removing an essentially oxygen-free inert gas from said bed;

(e) desorbing said first bed adiabatically by reducing the pressure in said bed and by utilizing the heat of absorption to drive absorbed oxygen off of said dioxygen absorbent;



(f) repressurizing said first bed with essentially pure oxygen-free inert gas from the downstream flow of product gas from said second bed;

(g) terminating said absorption on said second bed before oxygen breakthrough in said bed;

(h) switching the flow of the inert gas stream back to the first dioxygen absorbent bed, while desorbing the second bed as described in step (e) above;

(i) repressurizing the second bed with essentially pure oxygen-free inert gas from the downstream flow of product gas from said first bed;

(j) cyclically repeating steps (a) through (i) for the production of an essentially oxygen-free inert gas.

4,421,532

PROCESS FOR REMOVING AND RECOVERING VOLATILE ORGANIC SUBSTANCES FROM INDUSTRIAL WASTE GASES

Massimo Sacchetti, Via Azalee; Giovanni Aguzzi, P.zza Napoli, both of 11 Milano; Gianvittorio Bianchi, Frazione Alperolo, Albuzzano (Pavia), and Giuseppe Caroprese, Via Matteotti, 40/70, Arese (Milano), all of Italy

Filed Jul. 27, 1981, Ser. No. 287,038

Claims priority, application Italy, Aug. 8, 1980, 24105 A/80

Int. Cl.³ B01D *53/04*

U.S. Cl. 55—28 **7 Claims**

1. A process for removing and recovering a volatile organic substance from an industrial waste gas comprising

(1) passing an industrial waste gas containing a volatile organic substance over a solid adsorbent for said volatile organic substance to adsorb said volatile organic substance therein,

(2) desorbing the sorbed solid adsorbent with a hot steam-free inert desorption gas circulating in a closed cycle, the desorbing operation comprising the steps of:

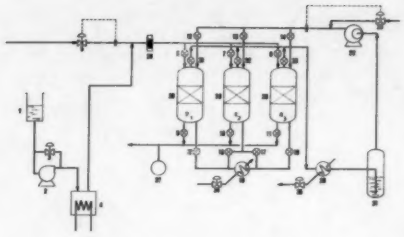
(a) heating a steam-free inert desorption gas,

(b) circulating the heated steam-free inert desorption gas through the sorbed solid adsorbent to be regenerated,

(c) cooling the circulated desorption gas now enriched with said volatile organic substance at a temperature suitable for condensation of most of said organic substance to form a condensate,

(d) separating said condensate from the remaining circulated desorption gas,

(e) purifying the desorption gas by passing said gas through the same adsorbent through which said industrial waste gas has passed in the adsorption step (1), said adsorbent being regenerated with the same desorption gas circulating in a closed cycle, and



(f) recycling the purified desorption gas to heating step (a), and

(3) recovering a portion of said volatile organic substance by cooling said hot steam-free inert desorption gas containing said volatile organic substance and recovering the remainder of said volatile organic substance by readsorbing said volatile organic substance in said inert gas on said solid adsorbent.

4,421,533

METHOD OF REMOVING OZONE AND COMPOSITION THEREFOR

Hiroshi Nishino, Osaka, and Masayuki Suzuki, Kyoto, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 209,707, Apr. 17, 1979, abandoned.

This application Mar. 24, 1982, Ser. No. 361,488

Claims priority, application Japan, Mar. 27, 1978, 53-35820; Apr. 5, 1978, 53-40580; Apr. 17, 1978, 53-45712

Int. Cl.³ B01D *53/04*

U.S. Cl. 55—68 **6 Claims**

1. A method for removing ozone from an ozone-containing gas which comprises contacting an ozone-containing gas with an activated carbon composition supported with (1) about 0.1 to 10 parts by weight as Mn based on 100 parts by weight of activated carbon of a manganese nitrate and (2) about 0.1 to 10 parts by weight as a metal element based on 100 parts by weight of activated carbon of sodium nitrate, potassium nitrate or a mixture thereof.

4,421,534

TOWER FOR REMOVING ODORS FROM GASES

James D. Walker, Aurora, Ill., assignor to Welles Products Corporation, Roscoe, Ill.

Continuation of Ser. No. 482,484, Jun. 24, 1974, abandoned.

This application May 26, 1976, Ser. No. 690,004

Int. Cl.³ B01D *53/18*; C02F *3/04*

U.S. Cl. 55—73 **4 Claims**

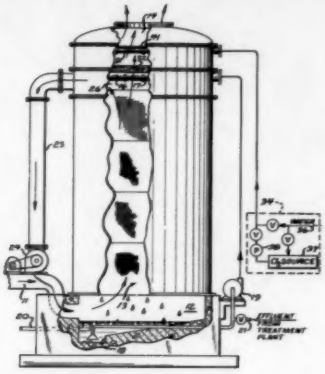
1. The method of removal of odor from gas including passing the gas through a column of contact media while trickling through the column a liquid promoting growth of bio-slimes, characterized in that said method includes:

(a) the step of recirculating a portion of the gas which has passed upwardly through the column, by passing it through the same column again whereby on the average repeated flow of the gas through the same media is provided;

(b) and distributing to media so positioned in the column that

the gas passes through it, after passing through and leaving the portion through which said recirculated liquid trickles, a fresh, nonrecirculated chemically active odor-removal liquid.

4. Apparatus for removal of odor from gases including a column of contact media having at least 60 square feet of contact surface per cubic foot of media, a housing surrounding



said column and providing a gas entry chamber, a gas discharge passage and a sump, and distribution means for distributing over a cross-section of the media at a high level thereof a liquid promoting the growth of bio-slimes for trickling through the column to the sump, characterized in that:

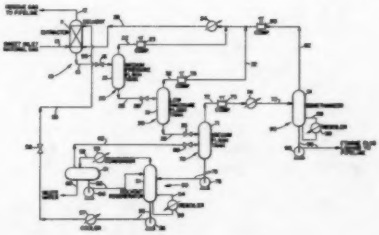
the contact media has successive sections, two of relatively fine media, and one between them of relatively coarse media of the same nature.

4,421,535

PROCESS FOR RECOVERY OF NATURAL GAS LIQUIDS FROM A SWEETENED NATURAL GAS STREAM

Yuv R. Mehra, Odessa, Tex., assignor to El Paso Hydrocarbons Company, Odessa, Tex.

Filed May 3, 1982, Ser. No. 374,270
Int. Cl.³ F25J *1/02*
U.S. Cl. 62—17 **25 Claims**



1. A continuous process for separating water and hydrocarbonns heavier than methane from a natural gas stream at pipeline pressures, comprising removing said water and said hydrocarbons heavier than methane as a C_1+ mixture to substantially any selected degree, including the following steps:

A. extracting said natural gas by flowing countercurrently to the natural gas stream a solvent consisting essentially of polyalkylene glycol dialkyl ethers at said pipeline pressures and at a rate sufficient to produce rich solvent containing water, methane, ethane, and hydrocarbons heavier than ethane, and residue natural gas of pipeline quality;

B. returning said residue natural gas to a pipeline and flashing said rich solvent at a medium pressure to produce a C_1-rich gas fraction and a medium-pressure liquid mixture of said water, said solvent, and a C_1+ mixture of hydrocarbons;

C. flashing said medium-pressure liquid mixture at low pressure to produce a C_1-rich gas fraction having a lower methane content than said gas fraction of step B and a low-pressure liquid mixture of said water, said solvent, and a C_2+ mixture of hydrocarbons containing minor amounts of methane;

D. flashing said low-pressure liquid mixture at a pressure of up to approximately atmospheric pressure to produce a gas mixture of essentially all C_1+ hydrocarbons, and an atmospheric-pressure liquid mixture of said water, said solvent, and minor amounts of hydrocarbons;

E. regenerating said solvent solely by removing said water and said minor amounts of hydrocarbons from said atmospheric pressure liquid mixture and returning the regenerated solvent to said extracting and returning said minor amounts of hydrocarbons to step D;

F. compressing and cooling said C_1-rich gas fractions produced in step B and step C and returning said cooled gas fractions to said extracting in step A; and

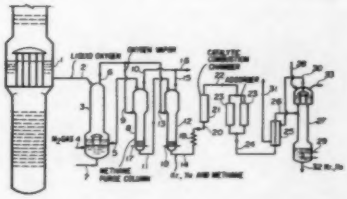
G. compressing, condensing, and cooling said gas mixture from step D to produce a liquid product.

4,421,536

PROCESS FOR PRODUCING KRYPTON AND XENON

Tatsuo Mori, Yokohama, and Juichi Ishii, Sakura, both of Japan, assignors to Nippon Sanso K.K., Tokyo, Japan

Filed Aug. 25, 1981, Ser. No. 296,151
Claims priority, application Japan, Aug. 29, 1980, 55-119441
Int. Cl.³ F25J *3/04*
U.S. Cl. 62—18 **9 Claims**



1. A process for producing krypton and xenon, comprising the steps of:

supplying to a first concentrating column liquid oxygen containing small concentrations of krypton, xenon, and hydrocarbons including methane accumulated in a main condensation section of an air separation plant;

rectifying and concentrating said liquid oxygen in the first concentrating column in which concentrations of said Kr,Xe and hydrocarbons are increased;

introducing the concentrated liquid into a methane purging column;

maintaining operation conditions within the purging column below explosive limits solely by bringing said concentrated liquid into countercurrent contact with oxygen gas introduced into the purging column in the absence of extraneous argon gas, and purging the methane with the oxygen from the top of the purging column;

bringing out of the methane purging column and vaporizing the concentrated liquid remaining in the bottom of the purging column;

thereafter effecting combustion of the vaporized concentrated liquid in a catalytic combustion reactor;

absorbing and removing water and carbon dioxide produced from the combustion for producing a purified gas mixture; and

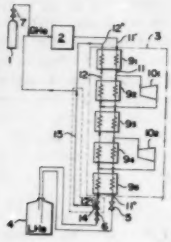
separating a mixture of krypton and xenon from the purified gas mixture in a second concentrating column.

4,421,537

HELIUM GAS LIQUEFYING APPARATUS

Yasuo Kuraoka, Sapporo, Japan, assignor to Hoxan Corporation, Sapporo, Japan

Filed Sep. 20, 1982, Ser. No. 419,824
Claims priority, application Japan, Oct. 9, 1981, 56-161226
Int. Cl.³ F25J *3/00, 3/06, 5/00*
U.S. Cl. 62—22 **1 Claim**



1. A helium gas liquefying apparatus, comprising:
(a) a liquefied helium reservoir (**4**);
(b) a compressor (**2**) with inlet means receiving a helium gas stock and connected to said reservoir;
(c) a plurality of heat exchangers (9_1, 9_2) connected in series with each other via a series liquefying line (**11**);
(d) a plurality of expansion engines (**10**, 10_2), connected in parallel with corresponding heat exchangers;
(e) a Joule-Thompson valve (**5**) connected from the outlet of said liquifying line to said reservoir;
(f) a series return line (**12**) with an inlet (**12'**), said series return line being disposed in reverse flow of said heat exchangers to said liquefying line and connected to said compressor inlet means;
(g) a return valve (**6**) connected to said reservoir;
(h) means for eliminating a temperature rise in the helium gas exhausted from a series liquefying line to the Joule-Thompson valve including a three-way valve having one passage connected to said return line inlet (**12'**) from said return valve, and a second passage branched therefrom connected to the inlet of said compressor inlet means; and,
(i) an additional line connected from the inlet of said compressor to said three-way valve.

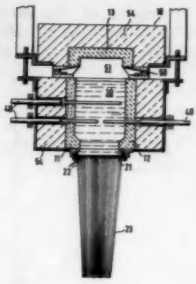
4,421,538

DEVICE FOR THE MANUFACTURE OF GLASS FILAMENTS

Osama Demaschquie, Hochheim, Fed. Rep. of Germany, assignor to Eglasstrek Patent Promotion & Awarding GmbH, Hochheim, Fed. Rep. of Germany

Filed May 4, 1981, Ser. No. 259,823
Claims priority, application Fed. Rep. of Germany, May 7, 1980, 3017374
Int. Cl.³ C03B *37/025*
U.S. Cl. 65—1 **11 Claims**

1. A device for making glass filaments, comprising:
a forehearth forming an elongate chamber connected to a supply of molten glass, said chamber being bounded by a pair of parallel sidewalls and having a floor with a plurality of longitudinally spaced-apart passages constituting entrance apertures for underlying bushings provided with filament-shaping bores; and
heating means including a multiplicity of rod-shaped electrodes extending into said chamber above solid portions of said floor adjoining and separating said passages, said electrodes being distributed throughout the length of said chamber below the level of a mass of molten glass of high specific electrical resistivity contained therein, each of said electrodes being connected at one end to a current



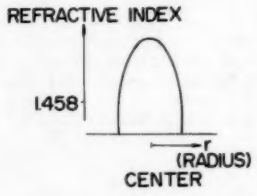
source and having a free opposite end located within said chamber for directly heating said mass.

4,421,539

METHOD OF PRODUCING ROD-SHAPED BASE MATERIAL FOR OPTICAL TRANSMISSION FIBER

Tadao Edahiro, Tookai; Kazuaki Yoshida; Kunio Ogura, both of Ichihara; Seiji Shibuya, and Hiroshi Murata, both of Tokyo, all of Japan, assignors to Nippon Telegraph & Telephone Public Corporation and The Furukawa Electric Co., Ltd., both of Tokyo, Japan

Filed Aug. 13, 1981, Ser. No. 292,676
Claims priority, application Japan, Aug. 22, 1980, 55-115493
Int. Cl.³ C03B *37/025*
U.S. Cl. 65—3.12 **3 Claims**



1. In a method of producing a rod-shaped base material by a vapor phase axial deposition process, said rod-shaped base material being used as part of an optical transmission fiber, the steps of:
(a) introducing and reacting into a bulb-shaped reaction zone having a elongated cylindrical portion, a glass soot-forming gas by an oxidation reaction while simultaneously introducing a dopant gas for varying the refractive index of glass;
(b) longitudinally accumulating soot containing said dopant thus produced thereby forming a soot-containing rod-shaped unit having a different dopant concentration which gradually decreases from the axial center of the produced rod toward the outer peripheral surface thereof;
(c) thereafter heating and sintering the glass soot-containing unit thus formed at a temperature of the order of 1500° C., so as to produce a transparent glass rod having a refractive index gradually decreasing from the axial center toward the outer peripheral surface thereof;
(d) removing within a range of 0.15% to 0.03% of the outer peripheral part of the transparent glass rod thus obtained so as to remove a flared part formed by the bulb shape of the reaction zone; and
(e) covering the outer periphery of the glass rod thus formed

with a tubular layer of glass quartz material and then thermally spinning the covered rod-shaped item thus formed so as to produce an optical transmission fiber.

4,421,540

SYSTEM FOR PRODUCING AN OPTICAL FIBER PREFORM WITH GAS VOLUME CONTROL

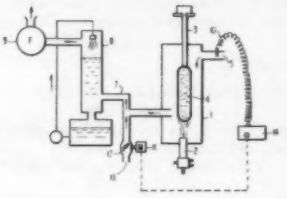
Motohiro Nakahara, Mito; Tetsuo Miyajiri, Kanagawa; Naoki Yoshioka, Kanagawa, and Toru Kuwahara, Kanagawa, all of Japan, assignors to Nippon Telegraph & Telephone Public Corporation, Tokyo and Sumitomo Electric Industries, Ltd., Osaka, both of, Japan

Filed Dec. 11, 1981, Ser. No. 329,915

Claims priority, application Japan, Dec. 12, 1980, 55-174730

Int. Cl.³ C03B *19/00, 37/07;* **C03C** *23/00*

U.S. Cl. 65—3.12 **5 Claims**



4. A process for producing an optical fiber preform in a muffle furnace by hydrolyzing a gaseous glass forming material with a flame from an oxyhydrogen burner and depositing the resulting soot in a rod shape, wherein a gas is supplied to the muffle furnace other than from said burner, holding the volume supply of said gas constant by controlling the amount of a control gas supplied into an intermediate portion of an exhaust pipe through which the gases formed in the muffle furnace and the fine glass particles that do not deposit in a rod shape are discharged.

4,421,541

PROCESS AND DEVICE FOR THE MANUFACTURE OF GLASS BY FLOTATION

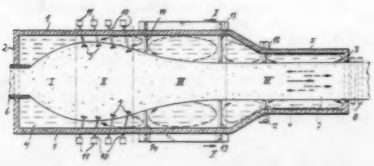
Gaston Eischen, Stolberg, Luxembourg; Thomas Eulenberg, Aachen; Helmut Göwert, Wurselen, both of Fed. Rep. of Germany; Rainer Grablowitz, Kelmis, and Michel Pernet, Brussels, both of Belgium, assignors to Saint Gobain Industries, Neuilly-sur-Seine, France

Filed Dec. 22, 1980, Ser. No. 218,709

Claims priority, application France, Dec. 21, 1979, 79 31477

Int. Cl.³ C03B *18/18*

U.S. Cl. 65—99.3 **15 Claims**



1. A process for the manufacture of plate glass including the step of pouring molten glass onto a bath of molten metal contained in a tank to form a glass ribbon and where the tank has an inlet end wall, an outlet end wall, side walls and a glass drawing zone, the step of advancing the glass ribbon on the molten bath from the upstream end wall in a downstream direction towards the outlet end wall, and the step of extracting the ribbon in the glass drawing zone by applying acceleration forces thereto whereby the feeding action of the ribbon causes a downstream flow of molten metal to form beneath the ribbon and reflect to in turn form a cooler upstream flow of molten metal towards said inlet wall end between said side walls and the edges of the ribbon; the improvement comprising the additional step of restricting the upstream flow of said cooler molten metal between the edges of the ribbon and said side walls by applying a plurality of pairs of side barriers symmetrically along the ribbon and between the side walls and edges of the ribbon in the glass drawing zone where the barriers extend into the bath of molten metal while at the same time leaving the downstream flow of molten metal unrestricted whereby any continuous upstream flow of cooler molten metal between the edges of the glass ribbon and said side walls between adjacent pairs of side baffles over the length of the drawing zone is substantially eleiminated to in turn reduce turbulence in the bath due to temperature differences.

6. Apparatus for the manufacture of plate glass comprising a tank for holding a bath of molten metal having an inlet end wall, an outlet end wall and side walls, feed means for feeding molten metal at a controlled rate to said bath adjacent the inlet wall end, advance means for advancing the molten glass on the surface of said bath to form a glass ribbon, and draw means in a glass drawing zone of the tank for drawing the glass ribbon; the improvement comprising in having an unobstructed space between the bottom surface of the ribbon and the bottom of the tank and in having a plurality of pairs of baffles symmetrically arranged on each side of the ribbon in a glass drawing zone where the baffles extend into the bath and from the side walls to substantially the edges of the glass ribbon to prevent upstream flow of molten metal in the direction of the inlet end wall between the edges of the glass ribbon and said side walls between adjacent pairs of baffles over the length of the drawing zone whereby turbulence in the bath due to temperature differences is reduced.

4,421,542

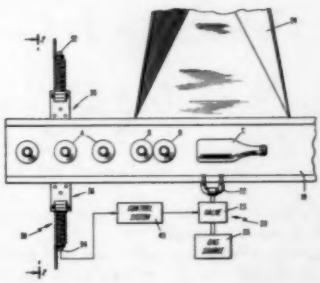
AUTOMATIC GLASSWARE FORMING MACHINE WITH AUTOMATIC DOWN AND/OR STUCK WARE REJECTION

William J. Poad; Urbano J. De Santis, and Lewis W. McFadden, all of Brockway, Pa., assignors to Brockway Glass Company, Inc., Brockway, Pa.

Continuation-in-part of Ser. No. 259,568, May 1, 1981, Pat. No. 4,354,865. This application Sep. 28, 1982, Ser. No. 426,226

Int. Cl.³ C03B *35/00*

U.S. Cl. 65—158 **5 Claims**



1. In combination, an automatic glassware forming machine comprising a conveyor on which a single line of normally upright, still-plastic wares having a thickened base and a greater length than diameter are transported for further processing in spaced relationship with respect to each other, and automatic stuck and down ware rejection apparatus comprising:

detecting means for sensing the passage of normal ware, stuck ware and down ware past an inspection location comprising:

source means for producing first and second spaced radi-

ant energy beams, said radiant energy beams being directed transversely across the transport path of the wares so as to be interrupted by the passage of normal, stuck and down ware, and being in coplanar alignment perpendicular to the transport path of the wares, and said first beam being disposed at an elevation in alignment with the bases of upright wares and said second beam being disposed at an elevation above said first beam; and

sensor means for sensing said radiant energy beams and producing a first signal for each item of sensed normal ware, stuck ware or down ware as long as either of said beams is interrupted by the sensed ware;

means responsive to each of said first signals for producing a second signal having a predetermined duration corresponding to the time required for a normal upright and spaced ware to be conveyed past said inspection location;

means responsive to each of said first and second signals for producing a reject signal when said first signal exceeds said second signal in duration, which corresponds to the detection of stuck ware or down ware; and

removal means responsive to said reject signal for removing the stuck ware or down ware which generated said reject signal.

4,421,543

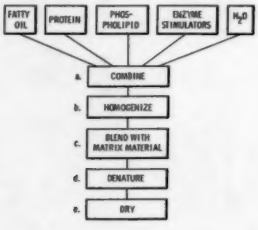
NUTRIENT FOR MUSHROOM GROWTH PROCESS FOR PRODUCING SAME

R. Barry Holtz, Los Gatos, Calif., assignor to Spawn Mate, Inc., San Jose, Calif.

Division of Ser. No. 251,108, Apr. 6, 1981, Pat. No. 4,370,159. This application Sep. 28, 1982, Ser. No. 425,479

Int. Cl.³ C05F *11/00*

U.S. Cl. 71—5 **16 Claims**



1. A method of preparing a nutrient particle for growing fungus, in steps comprising:

a. combining fatty oil material, activated protein material, phospholipid material, enzyme stimulator material and water;

b. homogenizing the combination of step a. into microencapsulated droplets "having an activated protein outer shall";

c. blending the homogenized droplets of step b. with a particulate anhydrous protein based matrix material to form a slurry of conglomerate particles;

d. treating the resulting conglomerate particles of step c. with a denaturing agent over a predetermined period of time to denature the protein of the matrix material; and

e. drying the denatured conglomerate particles of step d. to a predetermined moisture content range, to provide said droplets entrapped within the matrix material.

4,421,544

LEGUME-INOCULATING COMPOSITION

James L. Jones, Columbus; E. Glen Keyser, Grove City, and James C. Phillips, Plain City, all of Ohio, assignors to Agrigenetics Corporation, Columbus, Ohio

Filed Jun. 1, 1982, Ser. No. 383,586

Int. Cl.³ C05F *11/08*

U.S. Cl. 71—7 **6 Claims**

1. A legume-inoculating composition comprising, as essential ingredients:

(a) a viable fungus of the genus Arthrobotrys,

(b) a bacterium of the genus Rhizobium, and

(c) a nutrient for said fungus and said bacterium selected from the class consisting of a monosaccharide, a disaccharide, a polysaccharide, glycerol and cornmeal; the Arthrobotrys fungus being present in an amount equal to at least one propagule per gram of said composition and the Rhizobium bacterium being present in an amount equal to at least one million cells per gram of said composition.

4,421,545

HIGH STRENGTH MELAMINE-UREA FERTILIZER GRANULES

George M. Crews, Baton Rouge, La., assignor to Melamine Chemicals, Inc., Donaldsonville, La.

Filed Jan. 13, 1982, Ser. No. 339,201

Int. Cl.³ C05C *9/00*

U.S. Cl. 71—30 **6 Claims**

1. A method for preparing a melamine/urea granular agglomerate adapted fo use as a source of nitrogen for fertilizing applications consisting of:

forming a mixture of from 60 to 85 parts by weight melamine crystals and correspondingly from 40 to 15 parts of urea powder,

contacting said mixture with a spray of water or an aqueous solution of urea,

agglomerating the moistened mixture to form predominantly agglomerates having a nominal size of from 1 mm to 10 mm,

drying the agglomerates at less than 93° C.,

annealing the dried agglomerates by heating between 135° C. and 149° C., and

cooling the agglomerates whereby annealed melamine-urea fertilizer agglomerates are provided having increased crush strength.

4,421,546

AQUATIC METHOD

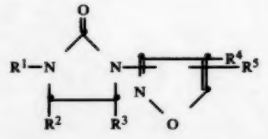
Kenneth W. Burow, Jr., Indianapolis, and Roger L. St. Clair, Greenfield, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 334,410, Dec. 24, 1981, Pat. No. 4,354,030. This application Jul. 29, 1982, Ser. No. 403,209

Int. Cl.³ A01N *37/100*

U.S. Cl. 71—66 **24 Claims**

1. A method for controlling the growth of aquatic plants comprising contacting the plants or the water in which the plants are growing with an aquatic herbicidally-effective amount of a compound of the formula:



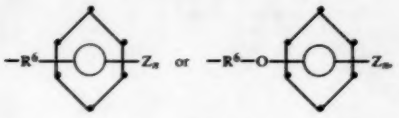
wherein:

R^1 is C_1–C_6 alkyl or allyl;

R^2 is hydrogen, C_1–C_6 alkyl, allyl, or hydroxy;

R^3 is hydroxy or halo;

R^4 is hydrogen, C_1–C_6 alkyl, halo, cyano, or nitro;
R^5 is C_1–C_6 alkyl, C_2–C_6 alkenyl, C_2–C_6 alkynyl, C_3–C_7 cycloalkyl, C_1–C_3alkyl-C_3–C_7 cycloalkyl, halo-C_1–C_6 alkyl, —R^6—O—R^7 or —R^6—S—R^7,
where R^6 is C_1–C_6 alkylene and
R^7 is C_1–C_6 alkyl; or R^5 is



wherein:
Z is nitro, halo, or R^7, and n is 0, 1, 2 or 3;
provided that R^2 is allyl or hydroxy when R^1 is allyl, R^3 is hydroxy, and R^5 is alkyl, cycloalkyl, alkylcycloalkyl or haloalkyl.

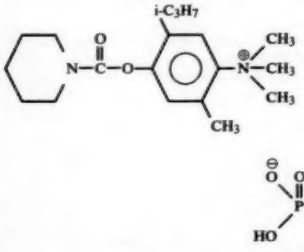
4,421,547

4-HYDROXY-5-ISOPROPYL-2-METHYLPHENYL TRIMETHYLAMMONIUM, 1-PIPERIDINE CARBOXYLATE SALT OF N-PHOSPHONOMETHYLGLYCINE AND ITS USE AS A HERBICIDE

Michael P. Prisbylla, Richmond, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Apr. 6, 1982, Ser. No. 364,397
Int. Cl.³ C07D *295/18;* **C07F** *9/65, 9/38;* **A01N** *57/20, 57/24, 37/46*
U.S. Cl. 71—86 **3 Claims**

1. A compound having the formula



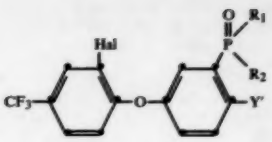
4,421,548

HERBICIDALLY ACTIVE 2-SUBSTITUTED 5-PENOXYPHENYLPHOSPHONIC ACID DERIVATIVES

Ludwig Maier, Arlesheim, and Dieter Dürr, Bottmingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 117,167, Jan. 31, 1980, Pat. No. 4,322,375. This application Dec. 28, 1981, Ser. No. 334,861
Claims priority, application Switzerland, Feb. 6, 1979, 1147/79
Int. Cl.³ A01N *57/14*
U.S. Cl. 71—86 **9 Claims**

1. A method of controlling weeds in crops of monocotyledonous or dicotyledonous cultivated plants which comprises applying thereto, either prior to emergence of said plants or after emergence of said plants, in an amount sufficient to destroy said weeds but insufficient to cause harm to said cultivated plants, a compound of the formula



wherein Hal is chlorine, bromine or iodine,
each of R_1 and R_2 is hydroxy, lower alkoxy, lower alkylthio, (lower alkyl) amino, di(lower alkyl) amino, chlorine, benzyloxy or benzylthio, and
Y′ is halogen, nitro or cyano.

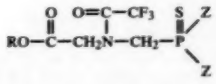
4,421,549

AMIDO AND HYDRAZIDO DERIVATIVES OF N-TRIFLUOROACETYL-N-PHOSPHINOTHIOYLMETHYLGLYCINE ESTERS

John E. Franz, Crestwood, and Robert J. Kaufman, University City, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 26, 1979, Ser. No. 107,209
Int. Cl.³ A01N *57/12, 57/14, 57/16*
U.S. Cl. 71—87 **21 Claims**

1. A compound of the formula

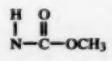


wherein R is a member of the group consisting of alkyl of from 1 to 8 carbon atoms, chloroalkyl of from 1 to 4 carbon atoms and from 1 to 3 chlorine atoms and alkoxyalkyl containing from 3 to 7 carbon atoms and wherein each Z is the same member of the class consisting of: a. —NHR′ and

wherein each R′ is individually selected from the class consisting of C_1–C_4 alkyl, C_2–C_4 alkenyl, C_3–C_7 cycloalkyl, benzyl or phenyl; b. a heterocyclic group selected from the class consisting of morpholine, pyrrolidine or piperidine; and c.

group wherein Z_1 is a —NHR″ or

group wherein R″ is C_1–C_4 alkyl or phenyl group; or a



group.

4,421,550

HERBICIDAL TRIAZOLE UREAS

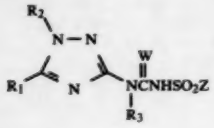
Thomas P. Selby, Hockessin, Del., and Anthony D. Wolf, Elkton, Md., assignors to E. I. Du Pont de Nemours & Co., Wilmington, Del.

Continuation-in-part of Ser. No. 282,174, Jul. 10, 1981, abandoned. This application May 28, 1982, Ser. No. 382,711

Int. Cl.[3] **A01N** *47/36*; **C07D** *249/12, 249/14, 401/12*

U.S. Cl. 71—92 **42 Claims**

1. A compound of the formula:



wherein

R_1 is H, C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, SR_4, OR_5, CH_2OR_6, $CH_2CH_2OR_6$, CF_3, CF_2CF_3, Cl, $NHCH_3$, $N(CH_3)_2$, $CH(OCH_3)_2$ or

R_2 is C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, CH_2OCH_3, $CH_2CH_2OCH_3$, CH_2SCH_3, $CH_2CH_2SCH_3$ or C_1–C_4 alkyl substituted with 1–3 F atoms;

R_3 is H or CH_3;

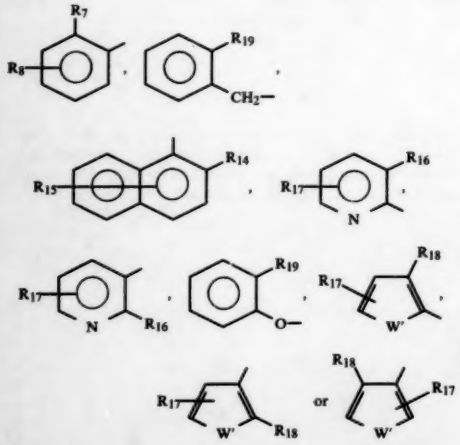
R_4 is C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, $CH_2CO_2R_6$ or $CH(CH_3)CO_2R_6$;

R_5 is C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, $CH_2CO_2R_6$, $CH(CH_3)CO_2R_6$ or CH_2CF_3;

R_6 is C_1–C_4 alkyl;

W is O or S;

Z is



R_7 is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, F, $C(O)NR_{21}R_{22}$, Cl, Br, NO_2, CF_3, CO_2R_9, $SO_2NR_{10}R_{11}$, $C(O)SR_{10}$, $SO_2N(OCH_3)CH_3$, QSO_2R_{12}, $S(O)_nR_{13}$, $CH_2CO_2R_{20}$, $CH(CH_3)CO_2R_{20}$, $CH_2S(O)_nR_{13}$, $CH(CH_3)S(O)_nR_{13}$, C_{13}–C_4 alkenyloxy, C_3–C_4 alkynyloxy, C_1–C_2 alkyl substituted with either OCH_3 or OC_2H_5, or C_1–C_3 alkoxy substituted with either (a) 1–5 atoms of Cl, Br or F or (b) OCH_3 or OC_2H_5;

R_8 is H, F, Cl, Br, CF_3, NO_2, C_1–C_3 alkyl or C_1–C_3 alkoxy;

R_9 is C_1–C_6 alkyl, $CH_2CH_2OCH_3$, $CH_2CH_2OCH_2CH_3$, $CH_2CH_2CH_2OCH_2CH_3$, C_3–C_6 alkenyl, C_3–C_6 alkynyl or C_1–C_3 alkyl substituted with 1–3 atoms of Cl or F;

R_{10} and R_{11} are independently C_1–C_3 alkyl;

R_{12} is C_1–C_4 alkyl, $CH_2CH_2OCH_3$, $CH_2CH_2CH_2OCH_3$ or C_1–C_4 alkyl substituted with 1–3 atoms of F, Cl or Br;

R_{13} is C_1–C_4 alkyl, allyl, C_1–C_3 alkyl substituted with 1–5 atoms of F, Cl or Br;

n is 0, 1 or 2;

Q is O or NCH_3;

R_{14} is H, CH_3, OCH_3, F, Cl, Br, NO_2, $SO_2NR_{10}R_{11}$, $SO_2N(OCH_3)CH_3$, OSO_2R_{12} or $S(O)_nR_{13}$;

R_{15} is H, Cl, Br, CH_3, OCH_3 or NO_2;

R_{16} is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, F, Cl, Br, CF_3, CO_2R_{20}, $SO_2NR_{10}R_{11}$, $SO_2N(OCH_3)CH_3$ or $S(O)_nR_{13}$;

R_{17} is H, F, Cl, Br, CH_3 or OCH_3;

W' is O or S;

R_{18} is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, F, Cl, Br, NO_2, CO_2R_{20}, $SO_2NR_{10}R_{11}$, $SO_2N(OCH_3)CH_3$ or $S(O)_nR_{13}$;

R_{19} is Cl, NO_2, CF_3, CO_2R_9, $SO_2N(OCH_3)CH_3$, $SO_2NR_{10}R_{11}$, QSO_2R_{12}, $S(O)_nR_{13}$ or C_1–C_3 alkoxy substituted with 1–5 atoms of Cl or F;

R_{20} is C_1–C_4 alkyl, $CH_2CH_2OCH_3$, CH_2CH_2Cl or $CH_2CH{=}CH_2$;

R_{21} is C_1–C_3 alkyl or C_6H_5;

R_{22} is C_1–C_3 alkyl; and

R_{21} and R_{22} may be taken together to be

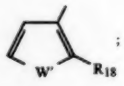
provided that

(1) the total number of carbon atoms of R_{10} and R_{11} is less than or equal to 4;

(2) the total number of carbon atoms of R_1 and R_2 is less than or equal to 6;

(3) when W' is O, then R_{18} is H, Cl, Br, CH_3 or CO_2R_{20};

(4) when W' is O and R_{18} is H, Cl, Br or CH_3, then Z is



(5) when W is S, then R_3 is H;

(6) when R_7 is H, then R_8 is H; and

(7) R_{14} and R_{15} may not both be NO_2.

29. A method for controlling the growth of undesired vegetation which comprises applying to the locus to be protected an effective amount of a compound of claim 1.

4,421,551

PROCESS FOR PREPARING ROTUND PARTICLES OF SALT-COATED MAGNESIUM OR MAGNESIUM ALLOY

Udo Mueller, Stavern, Norway, assignor to Norsk Hydro a.s., Oslo, Norway

Filed Jan. 29, 1982, Ser. No. 344,059

Claims priority, application Norway, Feb. 5, 1981, 810385

Int. Cl.[3] **C22C** *1/04*

U.S. Cl. 75—0.5 B **21 Claims**

1. A process for preparing rotund particles of salt-coated magnesium or magnesium alloy, which comprises:

adding a molten metal selected from the group consisting of magnesium and a magnesium alloy to a substantially non-hygroscopic salt melt, having a viscosity of from 1.5 to 5.0 cps containing at least 50% by weight of at least one

anhydrous alkali metal chloride, the density of said salt melt being substantially the same as the density of said molten metal;

stirring said molten metal and salt melt with a stirrer operating at a tip speed always below 450 meters per minute, at a temperature of from 660° to 730° C., to obtain a dispersion of said molten metal in said salt melt containing up to 60% by weight of said molten metal;

cooling said dispersion to solidify the molten metal and salt melt; and

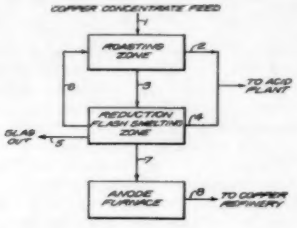
disintegrating the resultant solid product to obtain rotund particles of said salt-coated magnesium or magnesium alloy.

4,421,552

DEAD ROAST-OXIDE FLASH REDUCTION PROCESS FOR COPPER CONCENTRATES

James E. Hoffmann, South Plainfield, N.J., and Kohur N. Subramanian, Houston, Tex., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

Filed Apr. 16, 1982, Ser. No. 369,074
Int. Cl.³ C22B *15/00*
U.S. Cl. 75—9 **14 Claims**



1. A method of obtaining blister copper from a copper calcine comprising:

providing a finely divided copper calcine having a particle size less than about 60 mesh; and

charging said calcine into a reduction flash smelting zone for reduction therein, said calcine being charged into said zone with an oxygen-containing gas and a reductant, said gas and reductant being present in amounts sufficient to effect reduction of said calcine whereby blister copper is obtained.

4,421,553

PROCESS FOR OPERATING A BLAST FURNACE

Nikolas Ponghis, Neuville-en-Condroz; Arthur Poos, Embourg, and Roland Vidal, Grivegnes, all of Belgium, assignors to Centre de Recherches Metallurgiques, Liege, Belgium

Filed Mar. 24, 1981, Ser. No. 247,018
Claims priority, application Belgium, May 6, 1980, 6/47178
Int. Cl.³ C21B *4/00*
U.S. Cl. 75—41 **11 Claims**

1. In a method of continuously controlling a blast furnace wherein iron ore is reduced in the furnace to form pig iron having a temperature of 1300°–1600° C. and a Si % up to 2% and at least one reactor is used for heating a reducing gas, which reducing gas is introduced through at least one tuyere, the improvement comprising the steps of adjusting the composition and the temperature of the reducing gas in order to simultaneously control the following parameters: the coke rate; and temperature and Si content of the pig iron; wherein the temperature range of the reducing gas is between 1500°–2800° C. and the composition of the reducing gas is primarily CO, H_2, and possibly N_2, and small amounts of CO_2 and H_2O, the amount of H_2O+CO_2 being up to 193 Nm^3/mtHM;

(a) to control the coke rate within a value of between 50 kg/mt HM and 350 kg/mt HM of pig iron produced, the amount of at least one of the following components of the reducing gas selected from the group consisting of CO_2 or H_2O, and the temperature of the reducing gas is adjusted; for increasing the coke rate, the amount of said components and the temperature of the reducing gas are increased, and for decreasing the coke rate, the amount of said components and the temperature of the reducing gas are decreased; and

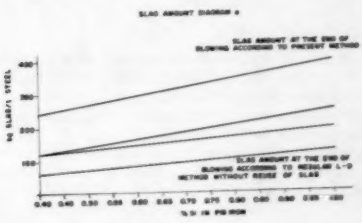
(b) to control the temperature and Si content of the pig iron, the amount of said components and the temperature of the reducing gas are adjusted; for increasing the temperature and Si content of the pig iron, the temperature of the reducing gas is increased and the amount of said components of the reducing gas is decreased, and for decreasing the temperature and Si content of the pig iron, the temperature of the reducing gas is decreased and the amount of said components of the reducing gas is increased.

4,421,554

PRODUCTION OF STEEL IN A BASIC CONVERTER EMPLOYING LIQUID CONVERTER SLAG

Gustav Mahn; Dieter Nolle, both of Wolfenbüttel, and Ulrich Eulenburg, Salzgitter, all of Fed. Rep. of Germany, assignors to Stahlwerke Peine-Salzgitter AG, Salzgitter, Fed. Rep. of Germany

Filed Jun. 24, 1982, Ser. No. 391,674
Int. Cl.³ C21C *7/00*
U.S. Cl. 75—52 **37 Claims**


SLAG AMOUNT DIAGRAM 6
SLAG AMOUNT AT THE END OF BLOWING ACCORDING TO PRESENT METHOD
kg SLAG/t STEEL
SLAG AMOUNT AT THE END OF BLOWING ACCORDING TO REGULAR L-D METHOD WITHOUT RESIDE OF SLAG
% Si IN PIG IRON

1. A method for production of steel in a basic converter employing liquid converter slag comprising

providing a start-up melt run by charging a converter with an iron material and a flux material;

blowing an oxidizing agent into the melt until the iron material is sufficiently decarburized to provide a steel composition and until the flux is converted into a slag;

retaining from about one third to two thirds of the slag material from a preceding charge in the converter;

adding to the slag material before or about beginning of blowing together with a flux material for slag formation an amount of from about 5.0 to 9.5 kilogram magnesium oxide material for each ton of steel depending on the silicon contents of the pig iron material;

charging the pig iron material into the converter;

making a first step addition of lime into the converter;

making an addition of scrap and a second step addition of lime such that the first step addition of the lime is an amount of from about 20 to 50 weight percent of the total addition of the lime in the first and second step addition and the second step addition of the lime is an amount of from about 50 to 80 weight percent of the total addition of the lime in the first and second step addition of the lime and where the second step addition of the lime is at a point in time of up to about 30 percent of the total blowing time;

blowing an oxidizing agent into the melt until the pig iron material is sufficiently decarburized and the flux materials are converted into a slag material such that after the termination of the blowing depending on the silicon contents in

the pig iron material of from 0.4 to 1 weight percent relative thereto a slag amount of from about 120 to 390 kilogram for each ton of steel is obtained.

4,421,555

METHOD OF AND APPARATUS FOR METALLURGICAL TREATMENT OF A MELT

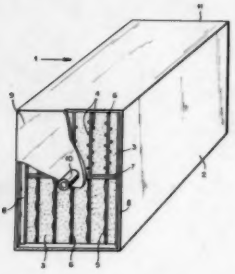
Paul Metz; Edouard Legille; Francois Schleimer, and Antoine Weiner, all of Grand-Duchy, Luxembourg, assignors to Arbed S.A., Luxembourg, Luxembourg

Filed Mar. 22, 1982, Ser. No. 360,815

Claims priority, application Luxembourg, Mar. 23, 1981, 83247

Int. Cl.³ C22C *33/08*

U.S. Cl. 75—53 **7 Claims**



1. A method of treating a metal melt comprising the steps of:

containing said melt in a vessel having below the level of said melt a gas-pervious wall portion defined by ceramic blocks defining narrow channels preventing the passage of molten metal therethrough;

suspending finely divided treatment solids in a gas; and

introducing the suspension through said wall portion into said melt and reacting said melt with said solids.

4,421,556

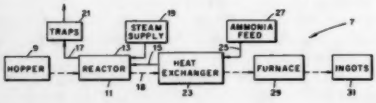
METHOD FOR DECONTAMINATION OF NICKEL-FLUORIDE-COATED NICKEL CONTAINING ACTINIDE-METAL FLUORIDES

Norman F. Windt, and Joe L. Williams, both of Paducah, Ky., assignors to the United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Dec. 28, 1982, Ser. No. 453,983

Int. Cl.³ C22B *23/06, 60/02*

U.S. Cl. 75—63 **9 Claims**



1. A process for decreasing the concentration of actinide-metal contaminants present in particulate nickel having a surface coating of nickel fluoride and containing nickel oxide, said process comprising:

contacting said nickel with gaseous ammonia in a reaction zone at a temperature promoting nickel-catalyzed dissociation of said ammonia into hydrogen and nitrogen to effect hydrogen-reduction of said nickel fluoride and nickel oxide,

heating the nickel so contacted to form a melt and a slag and to effect transfer of at least some of said actinide-metal contaminants from said melt into said slag, and

separating the resulting melt from said slag.

4,421,557

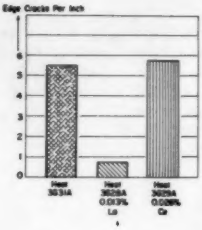
AUSTENITIC STAINLESS STEEL

Paul A. Rossomme, Midland; John J. Eckenrod, Coraopolis; Curtis W. Kovach, and Kenneth E. Pinnow, both of Pittsburgh, all of Pa., assignors to Colt Industries Operating Corp., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 170,364, Jul. 21, 1980, abandoned. This application Oct. 26, 1982, Ser. No. 436,873

Int. Cl.³ C22C *38/16, 38/20, 38/22, 38/42*

U.S. Cl. 75—125 **9 Claims**



1. An austenitic stainless steel having good corrosion resistance in chloride environments at relatively low nickel and molybdenum levels, said steel consisting essentially of, in weight percent, carbon 0.01 to 0.1, manganese 12 max., silicon 1 max., chromium 15 to 25, nickel greater than 16 to 25, molybdenum 3 to 7, a rare earth element consisting of lanthanum 0.005 to 0.05, nitrogen 0.1 to 0.50 and balance iron.

7. An austenitic stainless steel having good corrosion resistance in chloride environments at relatively low nickel and molybdenum levels, said steel consisting essentially of, in weight percent, carbon 0.01 to 0.1, manganese 12 max., silicon 1 max., chromium 15 to 25, nickel greater than 16 to 20, molybdenum 3 to 5.5, a rare earth element consisting of lanthanum 0.005 to 0.05, nitrogen 0.1 to 0.50 and balance iron.

4,421,558

IRON-BASED HEAT-RESISTANT CAST ALLOY

Toshiaki Morichika; Junichi Sugitani, both of Hirakata, and Takao Kobayashi, Nara, all of Japan, assignors to Kubota Ltd., Osaka, Japan

Filed Jan. 5, 1981, Ser. No. 222,629

Claims priority, application Japan, Jan. 10, 1980, 55-1684

Int. Cl.³ C22C *38/48*

U.S. Cl. 75—128 E **4 Claims**

1. An iron based, heat resistant cast alloy consisting essentially of, by weight %:

0.10 to 0.16 carbon

$1.0 \geqq Si > 0$,

$1.5 \geqq Mn > 0$,

17 to 23 chromium, 28 to 35 nickel, 0.3 to 2.0 niobium,

$0.1 \geqq Mo \geqq 0$,

$0.08 \geqq N \geqq 0$, 0.001 to 0.010 calcium, and the balance iron.

4,421,559

JET PRINTING INK COMPOSITION

Akio Owatari, Shiojiri, Japan, assignor to Epson Corporation, Nagano, Japan

Filed Oct. 26, 1981, Ser. No. 315,129

Claims priority, application Japan, Oct. 27, 1980, 55-150281

Int. Cl.³ C09D *11/02*

U.S. Cl. 106—20 **7 Claims**

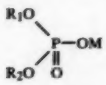
1. A jet printing ink composition comprising:

at least one humectant selected from the group consisting of diethylene glycol, triethylene glycol, tetraethylene glycol, polyethylene glycol, glycerol and mixtures thereof;

a freezing point lowering agent including urea and ethylene glycol;
a water-soluble dye; and
water.

4,421,560
THERMOCHROMATIC MATERIALS
Tutomu Kito, Nagoya; Norikazu Nakasuji, Aichi; Takashi Kataoka, Kasugai; Hiroshi Inagaki, Aichi, and Yutaka Shibahashi, Nagoya, all of Japan, assignors to Pilot Ink Company Ltd., Nagoya, Japan
Filed Apr. 8, 1982, Ser. No. 366,514
Claims priority, application Japan, Apr. 8, 1981, 56-52579
Int. Cl.³ C09D *11/00, 11/02*
U.S. Cl. 106—21 4 Claims

1. A reversible thermochromic material comprising:
(A) one or more electron-donating chromatic organic compounds selected from the group consisting of diaryl phthalides, indolyl phthalides, polyaryl carbinols, leuco auramines, acyl auramines, aryl auramines, Rhodamine B lactam, indolines, spiropyrans and fluorans, and
(B) one or more acidic phosphoric acid ester compounds of the following general formula (I):


(I)

wherein R_1 and R_2, which may be the same or different, each represents hydrogen, an alkyl group having from 1 to 22 carbon atoms, a branched alkyl group having from 3 to 20 carbon atoms, an alkenyl group having from 3 to 20 carbon atoms, a cycloalkyl group having from 5 to 24 carbon atoms or an aryl group having from 6 to 20 carbon atoms in proviso that R_1 and R_2 do not represent hydrogen at the same time, and M represents hydrogen, sodium, potassium, lithium, calcium, zinc, zirconium, aluminum, magnesium, nickel, cobalt, tin, copper, iron, vanadium, titanium, lead or molybdenum, the ratio of Component (A) to Component (B) being 1:1/10 to 50 by weight, said thermochromic material undergoing reversible metachromatism at a temperature within the range of from 40° C. to 120° C.

4,421,561
WATER BASED INK COMPOSITIONS USING ORGANIC ACID
Darryl W. Brixius, Upper Macungie Township, Lehigh County, Pa., assignor to Tarkett AB, Ronneby, Sweden
Division of Ser. No. 278,250, Jun. 29, 1981, Pat. No. 4,369,065, which is a continuation of Ser. No. 152,205, May 22, 1980, abandoned. This application Sep. 28, 1982, Ser. No. 425,990
Int. Cl.³ C09D *11/06*
U.S. Cl. 106—27 12 Claims

1. Process for chemically embossing heat-foamable and expandable resinous material which comprises applying to selected, predetermined portions of the surface of heat-foamable and expandable resinous material containing a foaming or blowing agent capable of causing said resinous material to grow and to expand upon heating, an aqueous, growth-controlling printing ink composition having a pH of from about 8 to about 12 and being capable of controlling the growth and expansion of said resinous material as a result of said heating, said foam-growth-controlling printing ink composition comprising the product of mixing together in an aqueous medium:
(a) at least one acid component selected from the group consisting of:
(i) organic carboxylic acid containing from 2 to 12 carbon atoms and having at least two carboxyl groups or at least one carboxyl group and one amino or hydroxy group;
(ii) anhydride of such acid; and
(iii) acid halide of such acid;
(b) aqueous printing ink composition;
(c) basic neutralizing agent in an amount sufficient to neutralize the acid component; and
(d) pH controlling agent sufficient to maintain the pH of the foam-growth-controlling ink composition between about 8 and about 12;
and heating said heat-foamable and expandable resinous material whereby said selected, predetermined portions to which said aqueous, foam-growth-controlling printing ink composition was applied attain heights differing from those other portions to which said aqueous, foam-growth-controlling printing ink composition was not applied.

4,421,562
MANUFACTURING PROCESS FOR HOLLOW MICROSPHERES
Bruce W. Sands, Malvern, Pa., assignor to PQ Corporation, Valley Forge, Pa.
Continuation of Ser. No. 253,139, Apr. 13, 1980, abandoned. This application Mar. 23, 1983, Ser. No. 478,006
Int. Cl.³ C04B *31/00*
U.S. Cl. 106—75 6 Claims

1. In a hollow microsphere with a shell consisting of an alkali metal silicate and a "polysalt" the improvement consisting of 0.5 to 5.0 parts by weight of a water-miscible porosity reducing organic liquid having a boiling point of at least 100° C. selected from the group consisting of polyhydric alcohols, and the mono- and dialkyl ethers of alkylene glycol or poly (alkylene) glycols being present in said shells for each 100 parts by weight of silicate and "polysalt" solids.

4,421,563
PRODUCTION OF CEMENT CLINKER
Paul Cosar, Paris, France, assignor to Fives-Cail Babcock, Paris, France
Filed Apr. 21, 1982, Ser. No. 370,540
Claims priority, application France, May 15, 1981, 81 9692
Int. Cl.³ C04B *7/44*
U.S. Cl. 106—100 6 Claims

1. A process of producing cement clinker from a dry raw material in a rotary kiln, which comprises the steps of
(a) preheating the raw material in heat exchange with combustion gases exhausted from the rotary kiln,
(b) furnishing at least a portion of the calories required for producing the cement clinker by a solid fuel,
(c) gasifying the solid fuel to produce said calories,
(d) contacting the gasified fuel with a fraction of the preheated raw material until it has been desulfurized,
(e) separating the reaction products of the desulfurization from the gasified fuel, and
(f) burning the desulfurized gasified fuel to deliver at least a portion of the calories required for producing the clinker.

4,421,564
HEAT COAGULABLE PAPER COATING COMPOSITION WITH A SOY PROTEIN ADHESIVE BINDER
Paul M. Graham, Ballwin, Mo., and Thomas L. Krinski, Granite City, Ill., assignors to Ralston Purina Company, St. Louis, Mo.
Filed Apr. 14, 1982, Ser. No. 368,190
Int. Cl.³ C08L *89/00*; A23J *1/12*
U.S. Cl. 106—154 R 24 Claims

1. A process for producing a heat coagulable paper coating composition containing a soy protein adhesive binder comprising:
(a) solubilizing a soy protein isolate to form a proteinaceous adhesive binder for said coating;
(b) mixing said adhesive binder with a mineral pigment to provide a slurry having a solids level of at least about 36% by weight of said slurry,

(c) controlling the pH of the slurry to between about 5.7 to 6.2 and adding to said slurry a material consisting essentially of a salt selected from the group consisting of Zinc Acetate and Zinc Formate in an amount effective to cause heat coagulation of said slurry at a temperature of 40°–60° C. upon heating thereof.

4,421,565

THIXOTROPIC AGENTS FOR ORGANIC SOLVENT-BASED SURFACE-COATING COMPOSITIONS AND SURFACE-COATING COMPOSITIONS CONTAINING SAME

Eugene P. DiBella, Piscataway, N.J., assignor to Nuodex Inc., Piscataway, N.J.

Filed Jul. 29, 1982, Ser. No. 402,879
Int. Cl.³ C08L 1/08; C09F 5/08; C08K 5/11
U.S. Cl. 106—180 14 Claims

1. A thixotropic agent for organic solvent-based surface-coating compositions that is the product of the reaction of (a) a polypentaerythritol component that contains at least 70% by weight of tripentaerythritol and more than 90% by weight of tripentaerythritol and higher polypentaerythritols with (b) a saturated aliphatic monocarboxylic acid component that contains at least 70% by weight of acids having 20 to 22 carbon atoms, in amounts that provide from 0.70 mole to 0.90 mole of carboxyl groups per mole of hydroxyl groups.

4,421,566

WARP SIZE

Michael J. Hasuly, South Plainfield; Daniel B. Solarek, Somerville, and Wadym Jarowenko, Green Brook, all of N.J., assignors to National Starch And Chemical Corporation, Bridgewater, N.J.

Filed Sep. 17, 1982, Ser. No. 419,397
Int. Cl.³ C08B 31/08; D06B 3/10, 3/32
U.S. Cl. 106—213 5 Claims

1. A warp sizing composition comprising 100 parts water; 3–50 parts of a cationic starch derivative comprising a high amylose starch containing more than 50% amylose, having a water fluidity viscosity within the range of 65 to 80 and a nitrogen content of 0.5 to 0.9% (dry basis); and 0.5–10% by weight of the cationic starch derivative of a softener.

4,421,567

SEPARATORY PROCESS USING ORGANIC BOUND ADSORBENTS

Santi Kulprathipanja, Hoffman Estates, and Armand J. deRosset, Clarendon Hills, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 160,521, Jun. 18, 1980, Pat. No. 4,337,171. This application Apr. 5, 1982, Ser. No. 365,434
Int. Cl.³ B01J 20/18; C13D 3/12, 3/14
U.S. Cl. 127—46.3 8 Claims

1. A process for the separation of one sugar component from a feed stream comprising an aqueous solution of a blend of sugar components, which process comprises:

(a) contacting said aqueous solution with an adsorbent comprising a mixture of a Type X or Type Y zeolite, from about 20.0 wt% to about 35.0 wt% of a alkali or alkaline earth exchange resin and from about 20.0 wt% to about 35.0 wt% of a water permeable organic polymer binder, wherein the weight ratio of said Type X or Type Y zeolite to said alkali or alkaline earth exchange resin is from about 1.0 to about 3.0, said mixture exhibiting an adsorptive selectivity toward one of said components, thereby selectively adsorbing said component from said blend;

(b) separating the solution from said adsorbent; and

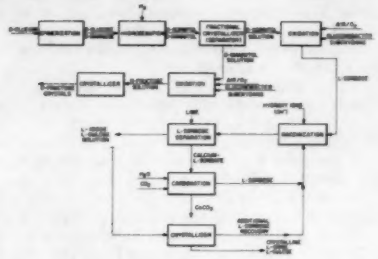
(c) thereafter recovering said adsorbed component by desorption thereof from said adsorbent.

4,421,568

PROCESS FOR MAKING L-SUGARS AND D-FRUCTOSE

Derk T. A. Huibers, Pennington, N.J., assignor to Hydrocarbon Research, Inc., Lawrenceville, N.J.

Filed Aug. 26, 1981, Ser. No. 296,403
Int. Cl.³ C07H 3/02; C13K 13/00; C13D 3/02
U.S. Cl. 127—48 10 Claims



1. A method for producing L-sugars including L-idose and L-gulose and D-fructose from D-glucose which comprises the steps of:

(a) epimerizing D-glucose to a mixture of D-glucose and D-mannose;

(b) hydrogenating said D-glucose mixture to provide L-sorbitol and D-mannitol;

(c) separating said D-mannitol from said D-sorbitol;

(d) oxidizing separately said D-sorbitol and D-mannitol to provide L-sorbose and D-fructose, respectively;

(e) racemizing said L-sorbose to provide a mixture of L-sorbose, L-idose and L-gulose; and

(f) precipitating the remaining L-sorbose with lime from a dilute solution of said mixture of L-sorbose, L-idose, and L-gulose.

4,421,569

CORROSION PROTECTION OF STEEL PIPES

Michael Dichter, and Carl Horowitz, both of Brooklyn, N.Y., assignors to Sharon Tube Corp., Sharon, Pa.

Filed May 7, 1982, Ser. No. 376,549
Int. Cl.³ C23C 1/10
U.S. Cl. 148—6.14 R 10 Claims

1. Composition which when cured in contact with a steel object forms a coating thereon to protect the steel object against corrosion, said composition comprising an aqueous emulsion of:

(a) hydroxyethyl or hydroxypropyl methacrylate, methyl, ethyl or butyl acrylates or methacrylates, dimethylamino or diethylamino, ethylacrylates or methacrylates, or vinyl pyrrolidone, or mixtures thereof, as monomer,

(b) epoxy resins based on bisphenol A and epichlorohydrin, phenol based or cresol based poly functional epoxy novolac resins, water reducible epoxy esters, water reducible urethane prepolymers or hydroxyl terminated or carboxyl terminated acrylic prepolymers, as prepolymer,

(c) a silver, ferric ferrous, cupric or cobalt salt or mixtures thereof as graft initiator,

(d) a peroxide or persulfate as catalyst, and

(e) water.

7. Method for protecting the surface of a steel object, which comprises applying the composition of claim 1 to the surface of the steel object and curing said composition in contact with said surface.

4,421,570

MAKING MOLDS FOR CONTINUOUS CASTING

Horst Gravemann, Osnabrück, Fed. Rep. of Germany, assignor to Kabel und Metallwerke Gutehoffnungshutte AG, Hanover, Fed. Rep. of Germany

Filed Mar. 12, 1982, Ser. No. 357,683

Int. Cl.³ C22F 1/08

U.S. Cl. 148—11.5 C **9 Claims**

1. A method of making tubular, curved or straight molds for continuous casting, comprising the steps of

providing an age-hardening copper alloy;

making a tube from the alloy;

solution heat-treating the tube material;

subsequently age-hardening the tube at from 400° C. to 600° C. for at least 15 minutes for obtaining internal precipitation; and

cold-working the tube by explosion-forming in order to obtain its final size as to its interior serving as a mold cavity.

4,421,571

PROCESS FOR MAKING HIGH STRENGTH DEEP WELL CASING AND TUBING HAVING IMPROVED RESISTANCE TO STRESS-CORROSION CRACKING

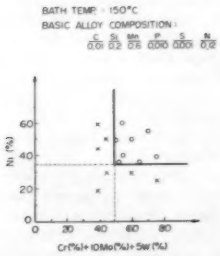
Takeo Kudo, Suita; Yasutaka Okada, Nishinomiya; Taishi Moroishi, Kobe; Akio Ikeda, Hyogo; Hiroo Ohtani, Kobe, and Kunihiko Yoshikawa, Suita, all of Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan

Filed Jun. 17, 1982, Ser. No. 389,568

Claims priority, application Japan, Jul. 3, 1981, 56-104111; Jul. 3, 1981, 56-104112; Jul. 3, 1981, 56-104113; Jul. 10, 1981, 56-106913; Jul. 10, 1981, 56-106914; Jul. 10, 1981, 56-106915; Jul. 13, 1981, 56-108985; Jul. 13, 1981, 56-108986; Jul. 13, 1981, 56-108987

Int. Cl.³ C22C 19/05

U.S. Cl. 148—11.5 R **18 Claims**



1. A process for manufacturing high strength deep well casing and tubing having improved resistance to stress corrosion cracking, which comprises preparing an alloy composition which is:

C	≦0.05%	Si	≦1.0%
Mn	≦2.0%	P	≦0.030%
S	≦0.005%	N	0–0.30%
Ni	25–60%	Cr	15–35%
Mo	0–12%	W	0–24%
Cr (%) + 10Mo (%) + 5W (%) ≧ 50%			
1.5% ≦ Mo (%) + ½W (%) ≦ 12%			
Cu	0–2.0%	Co	0–2.0%
Rare Earths	0–0.10%	Y	0–0.20%
Mg 0–0.10%	Ti 0–0.5%	Ca 0–0.10%	
and incidental impurities		balance;	

applying, after hot working, the solid solution treatment to the alloy at a temperature of from the lower limit temperature (°C.) defined by the following empirical formula: 260 log C(%)+1300 to the upper limit temperature (°C.) defined by the following empirical formula: 16Mo(%)+10W(%)+10Cr(%)+777 for a period of time of not longer than 2 hours; and applying cold working to the resulting alloy with a reduction in thickness of 10–60%.

4,421,572

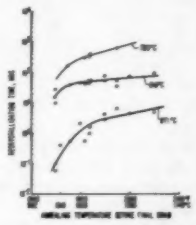
THERMOMECHANICAL TREATMENT OF ALLOYS

John F. Bates, Ogden, Utah; Howard R. Brager, Richland, Wash., and Michael M. Paxton, Gaithersburg, Md., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 18, 1982, Ser. No. 359,549

Int. Cl.³ C21D 8/00, 8/10

U.S. Cl. 148—12 E **7 Claims**



1. The method of treating an article composed of the alloy having the following composition in weight percent:

Chromium	17.00–18.00
Nickel	13.00–14.00
Carbon	0.040–0.060
Molybdenum	2.00–3.00
Manganese	1.50–2.00
Nitrogen	0.010 maximum
Aluminum	0.050 maximum
Arsenic	0.030 maximum
Boron	0.0010 maximum
Cobalt	0.050 maximum
Columbium	0.050 maximum
Copper	0.04 maximum
Phosphorous	0.020 maximum
Silicon	0.50–0.75
Sulphur	0.010 maximum
Tantalum	0.020 maximum
Vanadium	0.200 maximum
Iron	Balance

so as to reduce swelling under neutron bombardment, the said method comprising cold working said article in repeated steps, reducing the size of said article during each step so that it has predetermined final dimensions, said article being annealed, prior to each size-reduction step, by being heated to an annealing temperature within a predetermined temperature range and for a predetermined interval of time, and after said interval cooling said article, the said annealing temperature range for at least one of said annealing and reduction processes being such that swelling of an article treated by the method, under irradiation by neutron flux, is minimized while the time interval of continuous heating of the article at an elevated temperature, following treatment of the article by this method, after which recrystallization occurs, is at least of the order of 5000 hours.

4,421,573

METHOD FOR PRODUCING HOT-ROLLED DUAL-PHASE HIGH-TENSILE STEEL SHEETS

Toshio Irie; Toshiyuki Kato, both of Chiba, and Isao Takahashi, Kurashiki, all of Japan, assignors to Kawasaki Steel Corporation, Hyogo, Japan

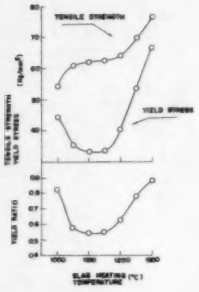
PCT No. PCT/JP81/00281, § 371 Date Jun. 9, 1982, § 102(e) Date Jun. 9, 1982, PCT Pub. No. WO82/01379, PCT Pub. Date Apr. 29, 1982

PCT Filed Oct. 14, 1981, Ser. No. 394,999

Claims priority, application Japan, Oct. 14, 1980, 55-143435

Int. Cl.³ C21D *8/02, 9/46;* C22C *38/34*

U.S. Cl. 148—12 F **5 Claims**



1. A method for producing a hot-rolled dual-phase high-tensile steel sheet having a structure consisting essentially of ferrite and martensite phases, which comprises preparing a slab comprising, by weight, 0.03–0.15% C, 0.5–1.0% Mn, more than 1%, up to 2.0% Si, 0.6–2.0% Cr, 0.01–0.1% Al, the balance being essentially Fe and accompanying impurities, heating said slab at a temperature of 1,050°–1,220° C., hot rolling the heated slab, completing the hot rolling at a temperature of 800°–900° C., cooling the resultant hot-rolled sheet to a temperature of 350°–500° C., and winding the sheet into a coil at the temperature of 350°–500° C.

4,421,574

METHOD FOR SUPPRESSING INTERNAL OXIDATION IN STEEL WITH ANTIMONY ADDITION

Grigory Lyudkovsky, Hammond, Ind., assignor to Inland Steel Company, Chicago, Ill.

Filed Sep. 8, 1981, Ser. No. 299,807

Int. Cl.³ H01F *1/04*

U.S. Cl. 148—111 **20 Claims**

1. In a process employing hot rolling and cold rolling for making a rolled steel product containing iron, carbon and at least one uncombined additional alloying element having an affinity for oxygen greater than that of iron, with said steel product being intended for subjection, in its cold rolled state, to at least one heating operation which causes oxidation of said uncombined alloying element in an internal oxidation layer adjacent the surface of said steel product, and wherein said uncombined alloying elements comprise silicon and aluminum included in said steel product to improve the magnetic properties thereof, a method for reducing the depth of said internal oxidation layer, said method comprising:

providing the steel product with an antimony content of at least about 0.02 wt.% and which will form, upon the performance of such a heating operation, an antimony-enriched layer at, and immediately adjacent, the surface of said steel product;

and minimizing the surface cleaning of said steel product before the completion of said cold rolling to minimize diminution of the antimony content before the performance of the first such heating operation after said completion of the cold rolling

there being no annealing step prior to the completion of cold rolling.

4,421,575

METHOD OF COOLING STEEL PIPES

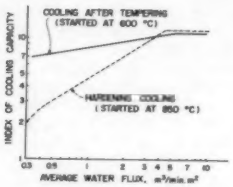
Kyohei Murata, Kitakyushu; Heiji Morise, Fukuma; Yoichi Yazaki, Kitakyushu; Kazushi Maruyama, Kitakyushu; Haruyuki Nagayoshi, Kitakyushu, and Etuji Kajiki, Kitakyushu, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Jan. 9, 1981, Ser. No. 223,924

Claims priority, application Japan, Jan. 16, 1980, 55-2588

Int. Cl.³ C21D *9/08*

U.S. Cl. 148—153 **3 Claims**


COOLING AFTER TEMPERING (STARTED AT 600 °C)
HARDENING COOLING (STARTED AT 850 °C)
INDEX OF COOLING CAPACITY
AVERAGE WATER FLUX, m³/min.m²

1. In a method of cooling a hardened steel pipe after holding the pipe at a tempering temperature for a given period of time, the improvement which comprises the steps of:

spraying cooling water from outside onto the external surface of the pipe which is being conveyed in the direction of the longitudinal axis thereof, said water being sprayed at a rate of not lower than 0.05 $m^3/min.m^2$ and not higher than 2 $m^3/min.m^2$;

starting the cooling at a pipe temperature between 400° C. and 700° C.; and

continuing the cooling at a rate of not lower than 5° C./sec and not higher than 40° C./sec until the pipe temperature drops to between room temperature and 350° C., thereby causing an appropriate amount of circumferential residual tensile stress to arise at the inside surface thereof to enhance the collapse strength of the pipe.

4,421,576

METHOD FOR FORMING AN EPITAXIAL COMPOUND SEMICONDUCTOR LAYER ON A SEMI-INSULATING SUBSTRATE

Stuart T. Jolly, Yardley, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Sep. 14, 1981, Ser. No. 302,196

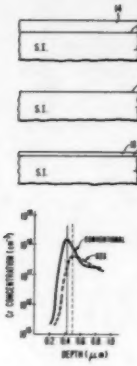
Int. Cl.³ H01L *21/20, 21/306*

U.S. Cl. 148—175 **7 Claims**

1. A method for forming a III–V type compound semiconductor film in a vapor phase deposition system, comprising:

epitaxially forming a first III–V type compound semicon-

ductor layer on a surface of a substrate, which is doped so as to be semi-insulating;
completely removing said layer; and



epitaxially forming a second III–V type compound semiconductor layer on said surface.

4,421,577

METHOD FOR MAKING SCHOTTKY BARRIER DIODES WITH ENGINEERED HEIGHTS

William E. Spicer, Stanford, Calif., assignor to The Board of Trustees of the Leland Stanford, Junior University, Stanford, Calif.

Filed Nov. 10, 1980, Ser. No. 205,452
Int. Cl.³ H01L *21/26*
U.S. Cl. 148—187 **6 Claims**

1. A method of fabricating a semiconductor device including group III elements and group V elements of the periodic table and having a metal contact thereon comprising the steps of:
(1) forming a semiconductor body including a first dopant of a first conductivity type and having a clean surface with minimal defects,
(2) introducing a second dopant into said surface,
(3) exposing said surface to an atmosphere including the group V element of the semiconductor body, and
(4) providing a metal contact on said surface.

4,421,578

CASTABLE HIGH EXPLOSIVE COMPOSITIONS OF LOW SENSITIVITY

Wallace E. Voreck, Jr., Sparta, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jul. 19, 1982, Ser. No. 399,391
Int. Cl.³ C06B *45/00*
U.S. Cl. 149—2 **9 Claims**

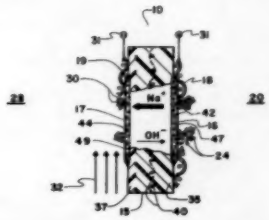
1. A castable high explosive composition comprising a mixture of about from:
2 to 57 wt. % ammonium nitrate
2 to 50 wt. % ethylenediamine dinitrate
1 to 10 wt % potassium nitrate
1 to 80 st % nitroguanidine.

4,421,579

METHOD OF MAKING SOLID POLYMER ELECTROLYTES AND ELECTRODE BONDED WITH HYDROPHYLLIC FLUOROCOPOLYMERS

Michael J. Covitch, Cleveland Heights; Donald L. DeRespiris; Leo L. Benezra, both of Mentor, and Elvin M. Vauss, Cleveland, all of Ohio, assignors to Diamond Shamrock Corporation, Dallas, Tex.

Filed Jun. 26, 1981, Ser. No. 277,918
Int. Cl.³ C25B *1/00*
U.S. Cl. 156—60 **7 Claims**



1. A method for making a copolymeric perfluorocarbon solid polymer electrolyte comprising the steps of:
(i) blending copolymeric perfluorocarbon in an equivalent weight range of from about 900 to about 1500 with a solvating dispersion media;
(ii) heating the blend to a temperature of between about 50° C. and 250° C.;
(iii) maintaining that temperature until a desired quantity of copolymer becomes solvated;
(iv) cooling sufficiently to form a gelatinous dispersion and forming said dispersion into a desired shape;
(v) cooling further until some of said dispersion media separate from the dispersion by syneresis, forming droplets within the dispersion;
(vi) continuing to cool at least until said droplets crystallize within said dispersion;
(vii) removing at least a portion of the unseparated dispersion media at a temperature below the melting point of the crystallized droplets;
(viii) hydrolyzing the shaped dispersion; and
(ix) removing the crystallized droplets to leave a porous, shaped, copolymeric perfluorocarbon solid polymer electrolyte.

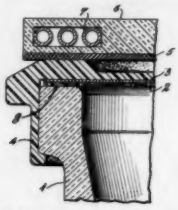
4,421,580
PREPARATION OF GLASS CONTAINER FOR THERMOPLASTIC CLOSURE

Michael T. Dembicki, and William J. Poad, both of Brockport, Pa., assignors to Brockway Glass Company, Inc., Brockway, Pa.

Division of Ser. No. 339,340, Jan. 15, 1982, Pat. No. 4,389,266, which is a continuation-in-part of Ser. No. 233,056, Feb. 10, 1981, Pat. No. 4,324,601, which is a continuation-in-part of Ser. No. 86,398, Oct. 19, 1979, Pat. No. 4,260,438. This application Jan. 17, 1983, Ser. No. 458,705

Int. Cl.³ B67B *3/00*; B32B *17/10*

U.S. Cl. 156—69 **9 Claims**



1. A method for sealing a rim-like opening in a glass container, said rim-like opening having a sealing surface, comprising:

removing any contaminant material, if present, from the sealing surface,

treating said surface with a chemical agent comprising at least one metal oxide precursor selected from the group consisting of tin oxide and titanium oxide precursors and mixtures thereof and forming, respectively, a tin or titanium oxide or a mixture thereof coating on said surface, overcoating said tin or titanium oxide or a mixture thereof coating on said surface by

applying a chromium (III) organic metallic complex to said surface, and

pressing a membrane comprising a thermoplastic material against said sealing surface at a temperature above the softening point but below the melting point of the plastic.

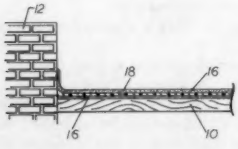
4,421,581
SINGLE PLY ROOFING SYSTEM

Thomas O. Olsen, P.O. Box 18361, Wichita, Kans. 67218

Filed Apr. 14, 1982, Ser. No. 368,120

Int. Cl.³ E04B *2/00*

U.S. Cl. 156—71 **1 Claim**



1. A method of constructing a waterproof roofing covering over a substrate, said method comprising:

spraying a solution of RTV silicone rubber on said substrate;

laying a membrane of silicone rubber impregnated glass fiber fabric over said silicone rubber layer before the latter has fully cured; and

spraying said fabric with a second layer of RTV silicone rubbr solution, said solution of RTV silicone rubber comprising silicone rubber and a solvent therefore with a solids content of 50% to 70% by weight and a quantity of SiO_2 comprising 90 to 110% by weight of the combined silicone rubber and solvent, said SiO_2 having a particle size of 45 microns or less.

4,421,582
SELF-HEATING ARTICLE WITH DEFORMABLE ELECTRODES

David A. Horsma, Palo Alto, and Stephen H. Diaz, Los Altos, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

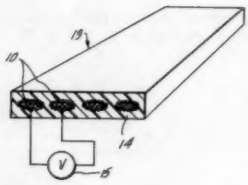
Continuation-in-part of Ser. No. 735,958, Oct. 27, 1976, abandoned, which is a continuation of Ser. No. 601,549, Aug. 4, 1975, abandoned. This application Jul. 25, 1977, Ser. No. 818,711

Claims priority, application United Kingdom, Aug. 3, 1976, 32378/76

The portion of the term of this patent subsequent to Apr. 18, 1995, has been disclaimed.

Int. Cl.³ H05B *3/12*; B29C *27/00*; H05B *3/38*

U.S. Cl. 156—86 **46 Claims**



1. A heat-recoverable article which comprises:

(a) a heat-recoverable, continuous member which comprises an organic polymer having sufficient finely divided electrically conductive particles dispersed therein to render the member conductive; and

(b) at least two electrodes which are in contact with said member and spaced from each other and which when connected to a source of electrical power cause current to flow through said member, and at least one of which electrodes is a deformable electrode which comprises a plurality of pliable electrically conductive elements and which, when said article is heat-recovered, undergoes a dimensional change in the direction of heat-recovery of said article without substantially impeding recovery of said article.

46. A process for providing a substrate with a covering which comprises:

(1) placing adjacent to the substrate a heat-recoverable article which on recovery will cover said substrate and which comprises:

(a) a heat-recoverable, continuous member which comprises an organic polymer having sufficient finely divided electrically conductive particles dispersed therein to render the member conductive; and

(b) at least two electrodes which are in contact with said member and spaced from each other and which when connected to a source of electrical power cause current to flow through said member, and at least one of which electrodes is a deformable electrode which comprises a plurality of pliable electrically conductive elements and which, when said article is heat-recovered, undergoes a dimensional change in the direction of heat-recovery of said article without substantially impeding recovery of said article; and

(2) connecting said electrodes to a source of electrical power, thereby causing said article to recover.

4,421,583

MAN-MADE FILAMENTS AND METHOD OF MAKING WOUND DRESSINGS CONTAINING THEM

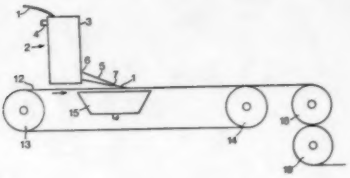
Fred C. Aldred, Cumbria, and Charles R. Moseley, Coventry, both of England, assignors to Courtaulds Limited, London, England

Continuation of Ser. No. 220,042, Dec. 18, 1980, abandoned. This application Sep. 22, 1982, Ser. No. 421,231

Claims priority, application United Kingdom, Apr. 18, 1979, 7913392

Int. Cl.³ D04H *3/16*

U.S. Cl. 156—167 **5 Claims**



1. A process for making a non-woven alginate fabric useful as a wound dressing comprising forming a tow of continuous calcium alginate filaments by extruding an alginate solution which has been treated with an oxidising agent into an aqueous solution of a calcium salt, stretching the tow of continuous calcium alginate filaments while still wet with calcium salt solution in an atmosphere of steam, spreading in a flow of water the tow of stretched continuous calcium alginate filaments which have been water washed but not dried, overfeeding the spread filaments onto a water pervious support so that the filaments cross over each other, and drying the filaments by suction while they are on the water-pervious support to such extent that the filaments become self-bonded to each other at their points of contact where they cross over each other in the absence of an adhesive or heat.

4,421,584

PROCESS FOR THE PRODUCTION OF SHEET-LIKE MATERIAL COMPRISING SPLIT FIBERS AND APPARATUS THEREFOR

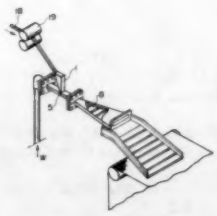
Hiroshi Kitagawa; Masaaki Sato, both of Nagoya, and Shoji Shuto, Oita, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Apr. 13, 1982, Ser. No. 368,233

Claims priority, application Japan, Apr. 13, 1981, 56-55207; Apr. 15, 1981, 56-56437

Int. Cl.³ D01D *11/02*

U.S. Cl. 156—178 **16 Claims**



1. A process for producing a sheet-like material composed of split fibers, comprising:

introducing a plurality of continuous fiber bundles into a liquid contained in an inclined splitting unit which is gradually extended in width toward the lower end thereof, said unit being divided into a plurality of grooves so that each fiber bundle travels with the liquid flowing in the corresponding groove;

splitting each fiber bundle by the action of liquid flowing in the groove while gradually extending the flow width toward the lower end of the groove;

uniformly arranging the resulting split fibers in a subsequent inclined splitting frame; and

continuously placing the thus arranged split fibers on a rotating conveyor to form the sheet-like material.

5. An apparatus for the production of a sheet-like material composed of split fibers, comprising:

a liquid tank from which a plurality of continuous fiber bundles are to be fed, said tank having a slit-like flow outlet provided at a lower portion of a side wall thereof, said bundles passing from said tank together with the liquid;

an inclined splitting unit which is gradually widened toward the lower end thereof, said unit being divided into a plurality of inclined grooves gradually widening toward the lower end of the unit, and plates forming walls of the groove being provided with a plurality of projections in a direction perpendicular to the flow-direction of the liquid; and

a subsequent inclined splitting unit which is gradually increased in width toward the lower end thereof, said unit being provided with a plurality of projections on a bottom plate thereof in a direction perpendicular to the flow direction of the liquid.

4,421,585

METHOD FOR PREPARING COVERING SHEETS OR STRIPS IN CREPE RUBBER, FOR USE IN THE PRODUCTION OF SHOES

Camille Boulier, Saint-Amand-Montrond, France, assignor to Chaussures Labelle, France

Filed Jun. 30, 1982, Ser. No. 393,602

Claims priority, application France, Jul. 2, 1981, 81 13030

Int. Cl.³ B32B *1/00*

U.S. Cl. 156—209 **1 Claim**

1. Method for preparing covering sheets or strips in crepe rubber, wherein the creped appearance is retained in the finished product such as shoes made from such sheets or strips, said method consisting in introducing substantially parallelepipedal and relatively flat pieces of natural rubber of around half a cubic decimeter, between the cylinders of an external mixer, turning at different tangential speeds, the relative space between the cylinders being reduced after each run therethrough of the resulting rubber coagulum, process wherein:

the relative tangential speed of the cylinders and the variation of the space between them are so adjusted as to obtain the formation of "crepe" or "crinkled" natural rubber without breaking the "nerve" of the material,

the pieces thus mechanically mixed, form a sort of a "tongue" or coagulum which, immediately its rear end drops out of the cylinder, is re-introduced therethrough by its front end;

various ingredients, preferably in pulverulent form, such as sulphur, coloring materials, accelerator, are sprayed over the coagulum, on at least some of these runs through the cylinders and penetrate into the rubber by the conjugated mild actions of compression and differential friction exerted by the cylinders;

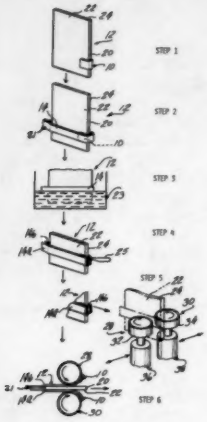
and the colored, sulphurated and accelerated coagulum thus treated, whose thickness is between 10 and 15 mm, is calendered on smooth and permanently cooled rollers turning at the same tangential speed, in a plurality of successive runs, the distance between these calendering rollers being progressively reduced until the thickness of the resulting strip or sheet is between 1 and 5 mm depending on the use it is wanted for;

and finally, wherein the shoe or other product is mounted with the side strips and sole sheets cold-creped as indicated hereinabove, then it is vulcanized in an autoclave in conditions of temperature, pressure and duration appropriate to the special nature of the basic rubber used.

4,421,586
PROCESS, DISPOSABLE ROLLER COVER, AND MASKING PREFORM FOR REMOVING ADHESIVE TAPE

Ronald Bargman, 1517 Ferris, Royal Oak, Mich. 48067

Filed Sep. 20, 1982, Ser. No. 419,907
Int. Cl.³ B32B 31/00
U.S. Cl. 156—247 5 Claims



1. A process for applying and removing pressure sensitive tape from opposite side surfaces of a generally planer body having edge surfaces comprising the steps of:

installing a masking preform on one edge of said body, said preform being frictionally secured by a pair of sides deflected upon installation to generate a spring force urging said sides into frictional engagement with a respective side surface, said sides overlying localized areas adjacent either side of said one edge;

applying a length of pressure sensitive tape to said planer body by wrapping about said edge and over said masking preform and extending along said side surfaces;

severing said masking preform and said tape along said edge; and

stripping said severed lengths by lifting off said severed ends overlying said severed portions of said preform and pulling said tape lengths free from said side surfaces.

4,421,587
LABEL FEEDER FOR FAN FOLDED DOCUMENTS

Kenneth L. Guenther, Park Ridge; Edward H. Zemke, Chicago, both of Ill., and Gerald D. Warden, Easton, Pa., assignors to Bell & Howell Company, Chicago, Ill.

Filed Jul. 19, 1982, Ser. No. 399,605
Int. Cl.³ B32B 31/18, 35/00
U.S. Cl. 156—256 29 Claims

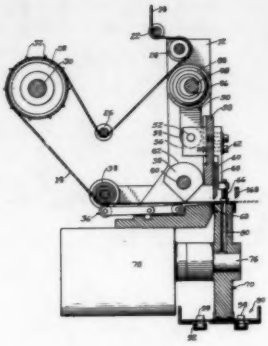
1. A method for preparing and feeding address labels on a web wherein the address labels are arranged in a column, with each address label equal in size to adjacent address labels, and non-addressed areas at equally spaced distances along the web, with the non-addressed areas separated by the address labels, the method comprising:

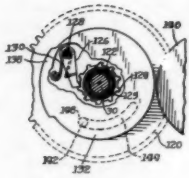
automatically feeding the web a first or second distance, the first distance equal to the desired height of a single label, and the second distance equal to the height of the non-addressed area plus the height of a single label;

feeding the web the first distance when only an address label is to be cut from the web and feeding the web the second distance when an address label and adjacent non-addressed area are to be cut from the web;

cutting the address label from the web after the web has been fed the first or second distance;

cutting the non-addressed area from the address label if the web was fed the second distance, so that all the address labels are substantially the same size when applied to the mail pieces;





removing the label after it is cut from the web;

applying the removed label to a mail piece at a label application location;

synchronously moving the mail piece through the label application location with the web advancing and cutting regardless of whether the web was fed the first or second distance.

4,421,588
PLASTICS ALLOY COMPOSITIONS

Glyndwr J. Davies, Uxbridge, England, assignor to AEPLC, England

Filed Oct. 22, 1982, Ser. No. 435,970
Claims priority, application United Kingdom, Oct. 22, 1981, 8131821
Int. Cl.³ B32B 31/20
U.S. Cl. 156—308.2 11 Claims

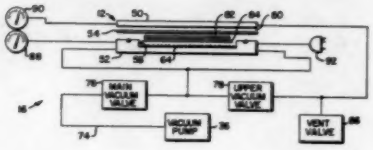
1. A method of making a plain bearing comprising a plastics alloy bearing layer and a metal backing, the method including the steps of mixing together a polyarylene sulphide and a polyether ketone to form an alloy, applying said alloy to said metal backing and bonding said alloy to said backing.

5. A method according to any one of claims 1 or 4 wherein said alloy is applied to said backing as a sheet and roll bonded.

4,421,589
LAMINATOR FOR ENCAPSULATING MULTILAYER LAMINATE ASSEMBLY

Anthony J. Armini, Bedford, and Michael J. Nowlan, Woburn, both of Mass., assignors to Spire Corporation, Bedford, Mass.

Filed Jul. 13, 1982, Ser. No. 397,824
Int. Cl.³ B29C *17/00*; C12H *1/00*
U.S. Cl. 156—382 **10 Claims**

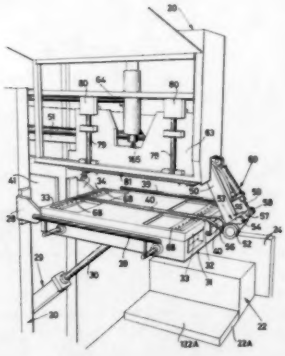


1. A laminator featuring a double-vacuum system and comprising:
(a) a chamber;
(b) means for opening and closing said chamber;
(c) means operatively associated with said chamber for creating a vacuum therein;
(d) a plurality of heaters surrounding said chamber;
(e) cooling means mounted in between said plurality of heaters;
(f) control means disposed on the front of said laminator for setting the processing parameters of said laminator, wherein said cooling means comprises a plurality of metal strips removably clamped between said plurality of heaters.

4,421,590
APPARATUS FOR THE SPLICING OF SHEET MATERIAL, PARTICULARLY FOR THE CONTINUOUS FEEDING OF FAST PRINTING MACHINES

Luciano Meschi, Leghorn, Italy, assignor to Wully S.A., Panama

Filed Jun. 22, 1981, Ser. No. 276,014
Claims priority, application Italy, Jun. 23, 1980, 22961 A/80; Jan. 26, 1981, 19335 A/80
Int. Cl.³ B31F *5/00*; G03D *15/04*
U.S. Cl. 156—506 **19 Claims**

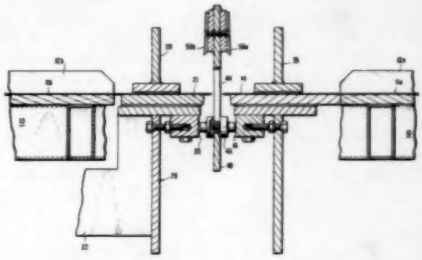


1. Apparatus for the continuous feeding of individual forms from a plurality of single forms to a fast printing machine, wherein the individual forms are assembled into respective packages in which said single forms therein are united among themselves at least along two side margins, the apparatus splicing the last form of one package to the first form of another package, the apparatus comprising
a splicing plane;
means for temporarily retaining respective sheets disposed on said splicing plane with respective edges thereof disposed in edge abutting relationship;
means for feeding a tape;
means for application of a splicing adhesive tape, said means for application being movable between a pick up position of the tape fed by said means for feeding and a position in which the adhesive tape is registered with respect to the edge abutting splicing edges; and
means for cutting and trimming the adhesive tape in correspondence to prefixed and adjustable positions; and presser means dimensioned and configured to engage the two adjacent edge abutting edges to be spliced and press them against the adhesive face of the adhesive tape, the tape having a notched or bored line to separate by tearing the two spliced sheets.

4,421,591
VENEER BUTT-END SPLICER

John DeLigt, Covington, Va., assignor to Westvaco Corporation, New York, N.Y.

Filed Mar. 9, 1982, Ser. No. 356,491
Int. Cl.³ B31F *5/00*; G03D *15/04*
U.S. Cl. 156—508 **5 Claims**



1. An apparatus for end splicing two wood veneer sheets of substantially the same thickness, said apparatus comprising:
a. first and second bed knives having parallel cutting edges disposed in a common table plane;
b. carriage means supporting said first bed knive for reciprocatory movement parallel with said table plane and transversely of said cutting edges;
c. table clamping means respective to each of said bed knives for securing the position of respective veneer sheets in said table plane over respective bed knife cutting edges, table clamping means respective to said first bed knife being supported by and movable with said carriage means;
d. shear plate means supporting first and second shear knives having cutting edges in parallel, spaced apart, first and second shear planes, said second shear plane respective to said second shear knife cutting edge being fixed to include the cutting edge of said second bed knive, said shear plate means being movably mounted to simultaneously translate said shear knife cutting edges transversely across said table plane in a substantially linear shearing motion from above said table plane to below said table plane; and,
e. spacing means carried by and slidably disposed within a confinement portion of said shear plate means that extends below said table plane when said shear knives are poised above said table plane for engaging abutment surfaces below and respective to each of said bed knives, such engagement being effective for limiting the movement of said first bed knife toward said second bed knife to a position whereat the cutting edge of said first shear knive is coplanar with the

cutting edge of said first bed knife during the translation of said shear knife edges past said bed knife edges.

4,421,592

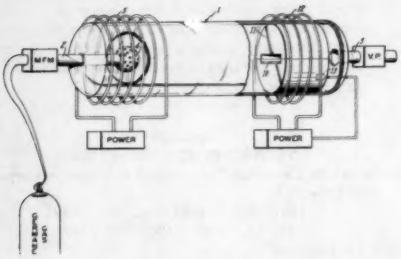
PLASMA ENHANCED DEPOSITION OF SEMICONDUCTORS

Alexander J. Shuskus, West Hartford, Conn., and Melvyn E. Cowher, East Brookfield, Mass., assignors to United Technologies Corporation, Hartford, Conn.

Filed May 22, 1981, Ser. No. 266,545

Int. Cl.³ C30B *25/10*

U.S. Cl. 156—613 **4 Claims**



1. A method for depositing large single crystal semiconductor thin films on alkali halide substrates which comprises:

a. providing a reaction and chamber means associated therewith for maintaining said chamber at a controllable low pressure;

b. providing means for generating a plasma within at least a portion of the reaction chamber, said plasma zone having a primary zone and a secondary zone;

c. providing a single crystal alkali halide substrate within the reaction chamber within the plasma zone, said substrate closely matching the semiconductor material to be applied in crystal structure and lattice parameter but having a melting point which is less than the melting point of the semiconductor to be applied, said substrate having associated means for maintaining said substrate at a controllable elevated temperature;

d. maintaining the substrate at an elevated temperature and introducing at least one semiconductor precursor gas into the reaction chamber and causing at least a substantial part of the at least one gas to flow through the plasma zone and over the substrate, and then removing said at least one precursor gas from the reaction chamber; while maintaining the reaction chamber at a pressure of from 0.1 to 10 torr;

whereby the semiconductor precursor gas will be largely decomposed in the plasma zone and the semiconductor will be deposited epitaxially on the alkali halide substrate while the substrate is held at a lower temperature than would be required if thermal decomposition was employed to decompose the precursor gas, thereby minimizing contamination of the deposited semiconductor by the substrate material.

4,421,593

REVERSE ETCHING OF CHROMIUM

Bernard J. Curtis, Gattikon, and Martin Ebnoether, Birmensdorf, both of Switzerland, assignors to RCA Corporation, New York, N.Y.

Filed Apr. 11, 1983, Ser. No. 483,876

Int. Cl.³ C23F *1/02;* **B44C** *1/22;* **C03C** *15/00, 25/06*

U.S. Cl. 156—643 **16 Claims**

1. A process of reverse etching a layer of chromium on a substrate comprising:

(a) forming a layer of resist material on the chromium layer;

(b) irradiating and developing the resist layer thereby exposing a portion of the chromium layer;

(c) plasma treating an assembly comprising said substrate and a backing plate comprised of a material resistant to liquids capable of etching chromium for a time sufficient to form a passivating coating on the exposed chromium by back-scattering material from said backing plate, but insufficient to remove all of said resist material;

(d) removing the remaining resist material, thus exposing the unpassivated portion of the chromium layer; and

(e) etching the unpassivated chromium layer with a liquid etchant.

4,421,594

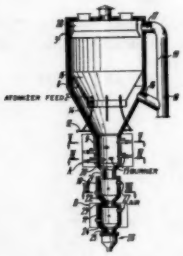
METHOD OF AND APPARATUS FOR PRODUCING GRANULATED PRODUCTS FROM A SUSPENSION

Viktor L. Bildjukevich, ulitsa Surganova, 8, kv. 37; Leonid N. Turovsky, ulitsa Brestskaya, 86, kv. 36; Vyacheslav J. Meleshko, proezd Golodeda, 9, kv. 6; Dmitry T. Yakimovich, ulitsa Knorina, 10b, kv. 33; Valentina A. Lebedkova, ulitsa Odoevskogo, 36/7, kv. 92; Boris K. Demidovich, 2 pereulok R. Ljuxemburg, 3-a, kv. 120; Gennady Z. Plavnik, ulitsa Ya. Kolasa, 74, kv. 2; Nikolai N. Dubrovsky, ulitsa R. Ljuxemburg, 193, kv. 55; Evgeny A. Proskalovich, ulitsa R. Ljuxemburg, 178, kv. 12, and Alexandr I. Pivovarov, ulitsa gaya, 38, korpus 2, kv. 5, all of Minsk, U.S.S.R.

Filed Aug. 10, 1981, Ser. No. 291,489

Int. Cl.³ B01D *1/14, 1/18*

U.S. Cl. 159—4 R **8 Claims**

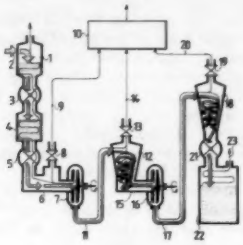


1. A method of producing granulated products from a suspension, comprising spraying a suspension in a suspension spraying zone, introducing a heat-carrier in the form of a spiral flow into a thermal treatment zone beneath the suspension spraying zone, drying the suspension by flowing the suspension concurrently relative to the heat-carrier and then countercurrently relative to the heat-carrier, simultaneously separating a fine fraction of the dried suspension by the heat-carrier flow and feeding the fine fraction to the suspension spraying zone, withdrawing spent heat-carrier after drying of the suspension, thermally treating suspension granules produced in the course of drying the suspension by flowing them in a spiral path counter-current to the heat-carrier in the thermal treatment zone up to a temperature sufficient to ensure the desired product properties, and withdrawing the thermally treated granules from the thermal treatment zone.

4,421,595
PROCESS FOR PREPARING THERMOMECHANICAL PULP WITH HEAT RECOVERY

Erkki Huusari, Kaipola, Finland, assignor to Yhtyneet Paperitehtaat oy Jylhavaara, Valkeakoski, Finland

Continuation of Ser. No. 110,747, Jan. 9, 1980, abandoned. This application Feb. 1, 1982, Ser. No. 344,624
Claims priority, application Finland, Jan. 12, 1979, 790106
Int. Cl.³ D21B 1/12; D21C 11/06
U.S. Cl. 162—23 3 Claims



1. An improved process for preparing thermomechanical pulp from wood chips, comprising:

(a) heating wood chips with process-generated steam in a storage reservoir at atmospheric pressure, and conducting the heated chips through a first lock feeder into a pressurized steaming chamber countercurrent to the steam flow, which further heats said chips in said pressurized chamber to a temperature of 100°–125° C.;

(b) passing the further heated chips from said pressurized chamber through a second lock feeder into feeding means for supplying the chips into an enclosed hot refiner, and producing wood pulp and pressurized steam therein at a refining temperature not less than about 135° C.;

(c) discharging a first portion of the steam from said refiner in complete countercurrent fashion to the chip flow successively back through said feeding means, second lock feeder, pressurized steaming chamber, first lock feeder and storage reservoir to progressively heat the chips, throttling a second portion of the steam to maintain the desired steam pressure and temperature in the hot refiner, and passing the throttled second portion of the steam to a heat exchanger for recovery of process heat;

(d) passing wood pulp along with a third portion of pressurized steam from said first refiner to a first cyclone separator, and passing seperated steam from said first cyclone seperator throttled to lower pressure to said heat exchanger for recovering process heat; and

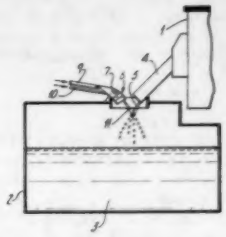
(e) passing the remaining wood pulp to a second refiner, from which the wood pulp and accompanying steam are passed to a second cyclone separator, from which recovered steam is throttled to a lower pressure and passed to said heat exchanger, and the pulp is passed through a third lock feeder to a container from which the remaining steam is vented to the atmosphere to prevent air from entering the process.

4,421,596
METHOD RELATING TO DISSOLVING MOLTEN SMELT

Ebbe T. Högberg, Karlstad, Sweden, assignor to Billerud Uddeholm Aktiebolag, Säffle, Sweden

Filed Mar. 18, 1982, Ser. No. 359,491
Claims priority, application Sweden, Mar. 23, 1981, 8101843
Int. Cl.³ D21C 11/04
U.S. Cl. 162—30.11 10 Claims

1. A method comprising dissolving molten smelt from the smelt spout in a chemical recovery apparatus in a sulphate pulp plant, characterized therein that the molten chemicals, which are discharged from the chemical recovery boiler, are caused to form a free falling stream, that a jet of air-water mist is formed by impinging an air jet against a water jet, and that the

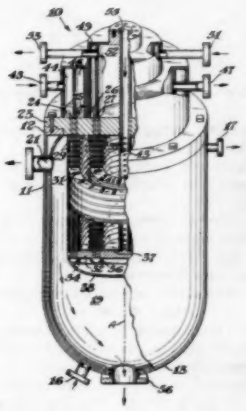


air-water mist jet is directed against the smelt stream such that the molten material is disintegrated into smaller droplets with reduced risk of violent reactions caused by water-smelt contact whereafter said droplets fall down into a bath (3), and the smelt is; dissolved in an aqueous solution to produce green liquor.

4,421,597
METHOD FOR RECOVERING HEAT IN AN ALKALINE PULP DIGESTING PROCESS

A. Douglas Armstrong, Duluth; Vernon B. Bodenheimer, Dunwoody, both of Ga., and Tom O. Rytter, Crossett, Ark., assignors to Georgia-Pacific Corporation, Atlanta, Ga.

Filed Dec. 8, 1981, Ser. No. 328,528
Int. Cl.³ D21C 7/08, 11/06
U.S. Cl. 162—47 36 Claims



1. A method for recovering heat in an alkaline pulp digesting process comprising the steps of:

(a) blowing a pulp and liquor mixture from a digester to a receiving container wherein the pressure in said receiving container rises above atmospheric pressure and vapor flashes from the mixture;

(b) controlling the transfer of the flash vapor from said receiving container in accordance with the pressure of said flash vapor by:

(i) transferring flash vapor from said receiving container to a pressure accumulator for accumulating the flash vapor therein at a pressure above atmospheric pressure when the pressure of the flash vapor rises to a predetermined pressure sufficiently above atmospheric pressure

to raise the temperature of a processing liquid in the pressure accumulator; and

(ii) transferring flash vapor from said receiving container to an atmospheric accumulator for heat recovery when the pressure of said flash vapor drops below the predetermined pressure; and

(c) mixing the flash vapor transferred to the pressure accumulator with the processing liquid at a pressure above atmospheric pressure to raise the temperature of the processing liquid.

4,421,598

BLEACHING PROCEDURE USING CHLORINE DIOXIDE AND CHLORINE SOLUTIONS

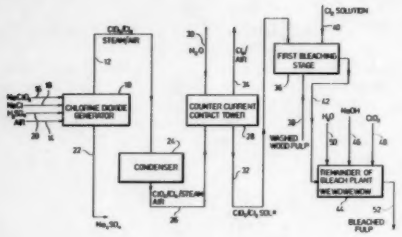
Douglas W. Reeve, Toronto, Canada, assignor to Erco Industries Limited, Islington, Canada

Continuation-in-part of Ser. No. 293,592, Aug. 17, 1981, which is a continuation of Ser. No. 98,524, Nov. 29, 1979, Pat. No. 4,299,653, which is a continuation-in-part of Ser. No. 30,557, Apr. 16, 1979, abandoned. This application Mar. 22, 1982, Ser. No. 360,595

The portion of the term of this patent subsequent to Nov. 10, 1998, has been disclaimed.

Int. Cl.³ C01B *11/02*; D21C *9/14*

U.S. Cl. 162—88 **13 Claims**



1. A method of bleaching pulp using chlorine dioxide, which comprises:

(a) continuously forming a gaseous mixture of chlorine dioxide, chlorine and steam by:

(i) continuously feeding a sodium chlorate solution to an aqueous acid reaction medium present in a unilocular reaction zone,

(ii) continuously feeding sulphuric acid to said aqueous reaction medium in an amount to maintain the total acid normality of the reaction medium in the range of about 2 to about 4.8 normal,

(iii) continuously feeding sodium chloride, hydrochloric acid or a mixture of sodium chloride and hydrochloric acid to said aqueous reaction medium,

(iv) continuously maintaining said reaction medium at a temperature of about 55° to about 85° C. while maintaining said reaction zone under a subatmospheric pressure of about 80 to about 300 mm Hg to cause the formation of chlorine dioxide and chlorine and the evaporation of water from the reaction medium,

(v) continuously depositing anhydrous neutral sodium sulphate from the reaction medium in said reaction medium in said reaction zone once the reaction medium becomes saturated thereby after start up, and

(vi) continuously removing the gaseous mixture of chlorine dioxide, chlorine and steam from the reaction zone;

(b) continuously cooling said gaseous stream to a temperature of about 3° to about 60° C. to cause condensation of at least a substantial proportion of the steam therefrom to provide a chlorine dioxide- and chlorine-containing gas stream;

(c) continuously contacting the latter gas stream with water having a temperature of about 0° to about 22° C. at a flow rate sufficient to form an aqueous solution of chlorine dioxide and chlorine containing chlorine in an amount of 6 to 10% of the available chlorine of the solution, and a gaseous chlorine stream; and

(d) bleaching a cellulosic fibrous material pulp for about 10 to about 60 minutes at a temperature of about 35° to about 70° C. in an aqueous suspension having a consistency of about 2 to about 16% by weight of pulp and containing no more dissolved organic material than up to about 2% by weight TOC on pulp at an overall equivalent chlorine concentration of about 2 to about 10% by weight of the pulp, by:

(i) subjecting said suspension to a first bleaching step at an acid pH value using at least part of said aqueous solution of chlorine dioxide and chlorine formed in step (c), and

(ii) without an intermediate washing step, subjecting the suspension to a second bleaching step at an acid pH using a chlorine solution formed from at least part of the gaseous chlorine stream from Step (c) and commencing about 5 seconds to about 10 minutes after commencement of said first bleaching step,

the chlorine dioxide in said aqueous solution of chlorine dioxide and chlorine constituting about 20 to about 90% of the total available chlorine used in said first and second bleaching steps.

4,421,599

FIBROUS MATERIALS

Shinichi Kuzuoka, Yokohama; Yoshinori Tachibana, Kawagoe; Goro Saito, Saitama, and Nobuyuki Kitajima, Hino, all of Japan, assignors to Toppan Printing Co., Ltd., Japan

Filed Nov. 30, 1981, Ser. No. 326,055

Claims priority, application Japan, Aug. 24, 1981, 56-132382

Int. Cl.³ D21H *5/12*

U.S. Cl. 162—100 **7 Claims**

1. A method of manufacturing a fibrous material containing large amounts of inorganic fine powders or inorganic short fibers comprising impregnating raw fibrous material with a polymer flocculant in the amount ranging from 0.01 to 5%, calculated as dry solids; drying the fibrous material impregnated with the polymer flocculant at a temperature lower than the denaturing temperature of the polymer flocculant; loosening the fibrous material into a bulky fibrous material, press-molding the bulky fibrous material at a pressure of 5 to 50 kg/cm^2 thereby forming a compact fibrous material; dispersing and disintegrating said compact fibrous material in water such that said impregnated polymer flocculant is released into the water; adding 98% to 50% by weight of the inorganic fine powders or inorganic short fibers to 2 to 50% by weight of said fibrous material to said dispersed and disintegrated fibrous material; and thereafter forming a fibrous material containing large amounts of inorganic powders or inorganic short fibers.

4,421,600

TRI-NIP PAPERMAKING SYSTEM

Ronald E. Hostetler, Vancouver, Wash., assignor to Crown Zellerbach Corporation, San Francisco, Calif.

Filed Jul. 6, 1981, Ser. No. 280,752

Int. Cl.³ D21H *5/24*

U.S. Cl. 162—111 **8 Claims**

1. A method for manufacturing a bulky, soft and absorbent paper web comprising the steps of:

positioning a wet web of principally lignocellulosic fibers on a first dewatering felt;

conveying the wet web while positioned on the first dewatering felt through a first nip formed by said first dewatering felt and a second dewatering felt to provide overall mechanical compaction of said web and partially dewater said web to an overall fiber consistency of from about 22% to about 35%;

conveying said partially dewatered and overall mechanically compacted web to a second nip formed between a dewatering felt and an open mesh imprinting fabric formed of woven filaments, said fabric having spaced

compaction elements and defining voids between the filaments;

while the partially dewatered, overall mechanically compacted web is in said second nip, rebulking said overall mechanically compacted web by impressing said web against said fabric whereby from about 5% to about 50% of said web will be compacted by said compaction elements and from about 50% to about 95% of said web will be impressed into said voids and displaced from the portion of the web compacted by said compaction elements;

retaining the rebulked web on said imprinting fabric after the rebulked web passes through said second nip; and

removing the rebulked web from the imprinting fabric before final drying thereof by applying the rebulked web to a creping surface at a third nip location, said third nip being formed between the creping surface and the imprinting fabric, and said rebulked web being retained on the imprinting fabric in an essentially undisturbed condition during retention thereof on said imprinting fabric between said second and third nips.

4,421,601

WATER-INSOLUBLE AZO-PURIMIDINE PIGMENTS AND THEIR USE IN COLORING SUBSTRATES

Günter Stephan, Schildgen, and Karl H. Schündehütte, Opladen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

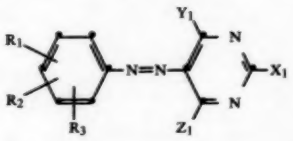
Division of Ser. No. 792,607, May 2, 1977, abandoned, which is a continuation of Ser. No. 703,012, Jul. 6, 1976, abandoned, which is a continuation of Ser. No. 513,486, Oct. 9, 1974, Pat. No. 4,014,863. This application Jan. 3, 1978, Ser. No. 866,538

Claims priority, application Fed. Rep. of Germany, Oct. 12, 1973, 2351294

Int. Cl.³ C09D *1/00, 11/02, 17/00;* **D06P** *1/44*

U.S. Cl. 162—162 **18 Claims**

1. In a process wherein a finely divided pigment is added to a substrate material to be colored in an amount sufficient to obtain a predetermined coloration of said material, the improvement comprising employing a dyestuff of the formula:



wherein

X_1 denotes amino, cyanamino, acetylamino, guanidino, ureido or hydroxyl;

Y_1 and Z_1 denote hydroxyl or amino, with the proviso that at most 2 of the 3 radicals X_1, Y_1 and Z_1 denote hydroxyl;

R_1 represents hydrogen, nitro, chlorine, bromine, C_1–C_4-alkyl, C_1–C_4-alkoxy, nitrile, C_1–C_4-alkylsulphonyl, trifluoromethyl, phenylsulphonyl, benzylsulphonyl, phenoxy, carbo-C_1–C_4-alkoxy, carbophenoxy, carbonamido, C_1–C_4-alkylcarbonylamino, benzoylamino, sulphonamido, or carbonamido or sulfonamide monosubstituted or disubstituted by C_1–C_4-alkyl, phenyl, or benzyl; and

R_2 and R_3 represent hydrogen; chlorine C_1–C_4-alkyl, carbo-C_1–C_4-alkoxy, carbonamido; carbonamido monosubstituted or disubstituted by C_1–C_4-alkyl, phenyl, or benzyl, or C_1–C_4-alkoxy.

4,421,602

LINEAR BASIC POLYMERS, THEIR PREPARATION AND THEIR USE

Fritz Brunnmueller, Limburgerhof; Rolf Schneider; Michael Kroener, both of Mannheim; Hans Mueller, Ludwigshafen, and Friedrich Linhart, Heidelberg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Rheinland-Pfalz, Fed. Rep. of Germany

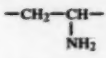
Filed Jul. 12, 1982, Ser. No. 397,234

Claims priority, application Fed. Rep. of Germany, Jul. 18, 1981, 3128478

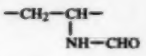
Int. Cl.³ C08F *22/36;* **D21H** *3/38*

U.S. Cl. 162—168.2 **8 Claims**

1. A linear basic polymer containing from 90 to 10 mole % of units of the formula



and from 10 to 90 mole % of units of the formula



and having a Fikentscher K value of from 10 to 200 (measured in 0.5% strength aqueous sodium chloride solution at 25° C.).

4,421,603

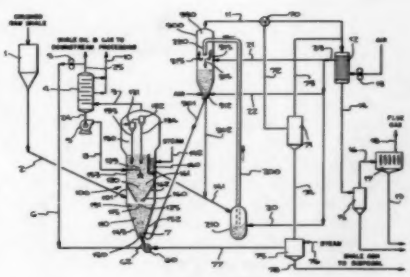
PROCESS FOR RECOVERING CARBONACEOUS LIQUIDS FROM SOLID CARBONACEOUS PARTICLES

Robert N. Hall, Boulder, Calif., assignor to Tosco Corporation, Los Angeles, Calif.

Filed Feb. 26, 1982, Ser. No. 352,653

Int. Cl.³ C10B *49/22, 53/06, 57/02*

U.S. Cl. 201—12 **14 Claims**



1. A method for pyrolyzing carbonaceous materials which comprises pyrolyzing solid carbonaceous particles in a pyrolysis zone having a first pyrolysis stage and a second pyrolysis stage, said pyrolysis zone being located within a single pyrolysis retort, both of said pyrolysis stages having an inverted frusto-conical shape with an apex and an open base, said pyrolysis stages being vertically oriented within said pyrolysis retort so that said second pyrolysis stage is located above said first pyrolysis stage, the apex of the second pyrolysis stage having an inlet in fluid communication with the base of said first pyrolysis stage, said pyrolysis comprising (i) forming, in said pyrolysis zone, a fluidized mixture of said solid carbonaceous particles and attrition resistant solid heat-carrying bodies in a fluidizing non-combusting gas having sufficient velocity to form said fluidized mixture of solid carbonaceous particles and solid heat-carrying bodies, the amount and temperature of said heat-carrying bodies being sufficient to heat said solid carbonaceous particles to their pyrolysis temperature; and (ii) uni-

formly pyrolyzing said fluidized solid carbonaceous particles within said pyrolysis zone by flowing said fluidized mixture upward through said first pyrolysis stage, through said inlet and upward through said second pyrolysis stage to form carbonaceous pyrolysis vapors and spent pyrolyzed solid carbonaceous particles containing inorganic material and residual carbon, separating said vapors from said spent solid particles and removing said vapors and said spent solid particles from said pyrolysis zone.

4,421,604

PROCEDURE TO CONTROL QUALITY OF COAL

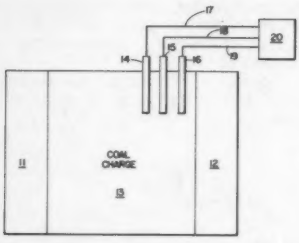
Wilhelm Weskamp, Wattenscheid; Gerd Nashan, Oberhausen, and Wilhelm Stewen, Dortmund, all of Fed. Rep. of Germany, assignors to Ruhrkohle Aktiengesellschaft, Essen, Fed. Rep. of Germany

Filed Oct. 23, 1981, Ser. No. 314,259

Claims priority, application Fed. Rep. of Germany, Oct. 25, 1980, 3040331

Int. Cl.³ C10B *47/06, 47/28, 57/06, 57/10*

U.S. Cl. 201—1 **11 Claims**



1. A method for producing coke of a desired quality from coal in a coking cycle, comprising the steps of:

charging a portion of said coal into a coke oven;

obtaining temperature measurements of the portion of said coal charged into a coke oven during the coking cycle of said coal, said temperature measurements being taken incrementally from the coke oven chamber wall towards the center of said oven chamber;

determining a temperature contour of the portion of said coal charge during the coking cycle of said charge, said temperature contour being based on said incremental temperature measurements;

measuring the width of a plastic zone in said coal as reflected in said temperature contour;

comparing said measured plastic zone width with a predetermined plastic zone width that is known to result in the production of coke of a desired quality;

adjusting at least one characteristic of a further portion of said coal so as to result in a change in the width of the plastic zone of said coal when said further portion is charged into the coke oven, said adjustment resulting in a plastic zone, having a width that more nearly resembles said predetermined plastic zone width;

charging said adjusted further portion of coal into the coke oven; and

heating said adjusted further portion of charged coke to produce coke of the desired quality.

4,421,605

DISTILLATION APPARATUS UTILIZING THERMOCOMPRESSOR PRINCIPLES

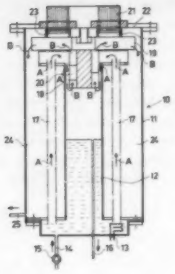
Esko Huhta-Koivisto, Espoo, Finland, assignor to Oy Finn-Aqua Ltd., Finland

Filed Mar. 19, 1982, Ser. No. 359,924

Claims priority, application Finland, Mar. 27, 1981, 810965

Int. Cl.³ B01D *1/06, 1/28, 3/04, 3/42*

U.S. Cl. 202—181 **11 Claims**



1. In distilling apparatus for operation according to the thermocompressor principle including a housing, a boiling chamber at least partially defined by a wall situated within the housing and adapted to contain the liquid to be distilled, means for heating the liquid to be distilled contained in the boiling chamber to produce a vapor, feed line means for conducting liquid to be distilled into the boiling chamber, means for imparting additional energy to the vapor produced in the boiling chamber having an inlet side to which the vapor formed in the boiling chamber is directed and an outlet side from which the vapor is discharged at an increased temperature, and distillate removal line means for withdrawing distillate from the distilling apparatus, the improvement comprising:

at least one heat exchange tube provided within the housing of the distilling apparatus and arranged such that a mixture composed of liquid to be distilled and a vapor flows therethrough;

droplet separation means provided within said housing, said droplet separation means being situated so as to define a gap between it and a wall defining the boiling chamber, and through which gap the mixture of liquid to be distilled and vapor discharging from said at least one heat exchange tube is adapted to flow;

said droplet separation means being arranged such that after the mixture of liquid to be distilled and vapor flows through said gap, the vapor flows through said droplet separator into said means for imparting additional energy to the vapor; and

wherein said means for imparting additional energy to the vapor is constituted by blower means situated within said distillation apparatus.

4,421,606

PROCESS FOR DISTILLING WATER

Kenji Tsumura, Nishinomiya, and Masayuki Yamashita, Osaka, both of Japan, assignors to Oriental Metal Mfg. Co., Amagasaki, Japan

Division of Ser. No. 129,740, Mar. 12, 1980, Pat. No. 4,329,205. This application Oct. 26, 1981, Ser. No. 315,236

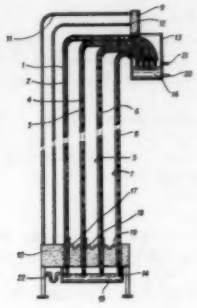
Claims priority, application Japan, Mar. 22, 1979, 54-34051; Aug. 11, 1979, 54-102576

Int. Cl.³ B01D *3/02*

U.S. Cl. 203—10 **3 Claims**

1. A process for distilling water which comprises providing a mirror-like heat-reflective surface on one side of a plurality of cooling plates, heating one side of a heat receiving plate mem-

ber, evaporating water to be treated which is held on the other side of said heat receiving plate member, condensing the resulting water vapor on the heat-reflective condensing surface of a cooling plate member which is the cooling plate member adjacent to said heat receiving plate member among a plurality of cooling plate members provided at a space to each other and in



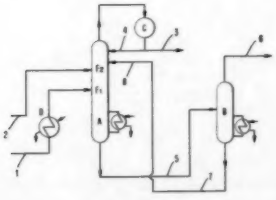
parallel with said heat receiving plate member, repeating the evaporation of water to be treated which is held on the opposite side of each cooling plate member to the condensing surface and the condensation of the resulting water vapor on the condensing surface of the next adjacent cooling plate member, said evaporation being caused by the latent heat of said condensation, and collecting the condensed water.

4,421,607

PROCESS FOR EXTRACTIVE DISTILLATION OF PLURAL HYDROCARBON MIXTURES

Shunichiro Ogura, Tokyo, Japan, assignor to Nippon Zeon Co. Ltd., Tokyo, Japan

Filed Feb. 1, 1983, Ser. No. 463,049
Claims priority, application Japan, Feb. 2, 1982, 57-15329
Int. Cl.³ B01D *3/40;* **C07C** *7/08*
U.S. Cl. 203—60 **5 Claims**



1. A process of extractive distillation for separating components easily soluble in a polar solvent from at least two hydrocarbon mixtures having different contents of the easily soluble components by extractive distillation using said polar solvent, which comprises feeding a hydrocarbon mixture containing a larger amount of the easily soluble components, as a gas, into the middle or lower portion of an extractive distillation column, feeding a hydrocarbon mixture containing a smaller amount of the easily soluble components, as a liquid, to the upper portion of the extractive distillation column, and subjecting them to extractive distillation.

4,421,608

METHOD FOR STRIPPING PEEL APART CONDUCTIVE STRUCTURES

Donald G. McBride, Binghamton, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 1, 1982, Ser. No. 353,310
Int. Cl.³ C25D *1/04, 7/06;* **C23F** *1/02*
U.S. Cl. 204—12 **8 Claims**

1. A method for stripping a peel apart structure, said peel apart structure having an electrolytic plated copper first layer in a predetermined superimposed and peelably adhered relationship with an electrolytic copper foil carrier second layer, said first and second layers having an average bond strength therebetween of approximately two to four psi, said method comprising the steps of:

providing water for reducing said average bond strength between said first and second layers approximately thirty to forty percent,

mechanically peeling apart said first and second layers, and

applying said water in a chemically inert manner between said first and second layers during the peel apart operation between said first and second layers.

5. In a method for making printed circuit boards, said method using at least one peel apart conductive flexible planar sheet structure having an electrolytic plated copper first layer in a predetermined superimposed and peelably adhered relationship with an electrolytic copper foil carrier second layer, said first and second layers having an average bond strength therebetween of approximately two to four psi, and a metal release agent third layer disposed between said first and second layers, said first and second layers having an average bond strength therebetween of approximately two to four psi, said method further including a step for mechanically peeling said second layer from said first layer, the combination therewith comprising the steps of:

providing deionized water for reducing said bond strength between said first and second layers approximately thirty to forty percent, and

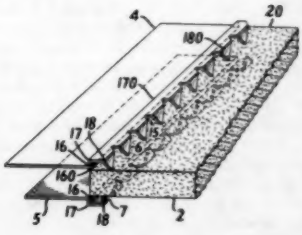
applying said deionized water in a chemically inert manner between said first and second layers during said peeling step.

4,421,609

PROCESS FOR PRODUCING ELECTRODE WITH CURRENT OUTLETS

Francois Gerard, and Jean-Yves Machat, both of Clermont-Ferrand, France, assignors to Compagnie Generale des Etablissements Michelin, Clermont-Ferrand, France

Division of Ser. No. 166,027, Jul. 7, 1980, Pat. No. 4,336,124.
This application Jan. 15, 1982, Ser. No. 339,485
Claims priority, application France, Jul. 16, 1979, 79 18549
Int. Cl.³ C25D *5/02*
U.S. Cl. 204—16 **4 Claims**



1. A process for producing an electrode comprising, on the one hand, at least one body formed at least in part of an electron-conductive porous skeleton with two main faces and, on the other hand, at least one current outlet, characterized by:

(a) making the current outlet with at least one electron-conductive plate having roughnesses, said roughnesses having, for each plate, main faces arranged substantially in a plane, the ratio $R_a=(S_f/S)$ being at least equal to 25% and at most equal to 70%, S_f representing the sum of the areas of these main faces for all the roughnesses of the outlet, and S representing the area of the cross-section of the skeleton in the vicinity of the roughnesses of said outlet, the cross-section being taken along a plane parallel to the plane or planes of said main faces of the roughnesses, S_f including the areas of any openings in the main faces of each plate;

(b) causing the roughnesses to penetrate into the skeleton;

(c) clamping the skeleton by pressure where it is in contact with the plate to result in a decrease Δe of the original thickness "e" of the skeleton, the ratio $R_S=(\Delta d/e)$ being at least equal to 5% and at most equal to 50%;

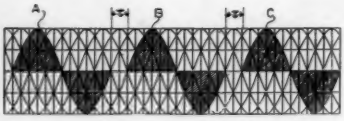
(d) electrolytically depositing a metal in the skeleton and firmly connecting the plate to the skeleton by means of the electrolytic metallic deposit which adheres both to the skeleton and to the plate, said deposit being inert under the conditions of use of the electrode.

4,421,610

ELECTROLYTIC COLORING PROCESS

Dionisio Rodriguez, General Mola. 74-8a, Planta, Madrid - 6, Spain

Filed Apr. 16, 1981, Ser. No. 254,589
Claims priority, application Spain, Jan. 16, 1981, 498,578
Int. Cl.³ C25D *11/22*
U.S. Cl. 204—35 N **3 Claims**



1. An electrolytic coloring process for aluminum or aluminum alloy sections which have been previously subjected to anodic oxidation, characterized by the following stages:

(a) subjecting an aluminum or aluminum alloy section which has been previously subjected to anodic oxidation to electrolytic treatment, in the absence of metal salts, in an electrolyte of a low power of disolution having a concentration in H+ equivalent to an H_2SO_4 solution of less than 4 gm/lt. by applying an alternating current having a peak voltage of between 55 and 85 volts and a current density of less than 0.3 amp/dm², said current being derived from the secondary branches of a polyphase transformer wherein the current is controlled so that a first phase is connected to apply one cycle of alternating current to the section, the first phase is disconnected and a second phase, which is the next consecutive phase after the first phase, is connected to apply one cycle of alternating current, the second phase is disconnected and a third phase is connected, and so on until each phase of the polyphase current has been sequentially connected to apply one cycle of alternating current to the section, said one cycle being composed of a positive half cycle and a negative half cycle, and wherein the positive and negative half cycles have the same conduction angle; and

(b) electrolytically coloring the treated section in an acid electrolyte containing a metal salt or salts, using alternating current at a peak voltage of between 55 and 85 volts, obtained from the same source of current use in the electrolytic treatment stage.

4,421,611

ACETYLENIC COMPOSITIONS AND NICKEL PLATING BATHS CONTAINING SAME

James C. Cameron, Lakewood, Ohio, assignor to McGean-Rohco, Inc., Cleveland, Ohio

Filed Sep. 30, 1982, Ser. No. 431,102
Int. Cl.³ C25D *3/16, 3/56*; C07C *33/04*
U.S. Cl. 204—43 T **32 Claims**

1. 3-(2-propynoxy)-2-propenoic acid.

2. A method of preparing 3-(2-propynoxy)-2-propenoic acid which comprises reacting propiolic acid with propargyl alcohol in an aqueous alkaline solution and thereafter acidifying the reaction mixture.

4. An acetylenic composition prepared by a process comprising the steps of

(a) reacting propargyl alcohol with an alkali metal permanganate in an aqueous alkaline solution,

(b) filtering the reaction mixture, and

(c) acidifying the filtrate with acid.

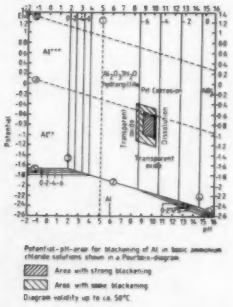
9. An aqueous acidic plating bath for the electrodeposition of nickel or a nickel-iron alloy on a substrate which bath comprises nickel ions, or a mixture of nickel ions and iron ions, and as a brightening and leveling agent, an effective amount of 3-(2-propynoxy)-2-propenoic acid.

4,421,612

PROCESS FOR THE PREPARATION OF A DARK-COLORED, WAVE-LENGTH SELECTIVE OXIDE FILM ON ALUMINUM

Ketil Videm, Kjeller, Norway, assignor to Institutt for Energiteknikk, Kjeller, Norway

PCT No. PCT/NO80/00036, § 371 Date Jun. 29, 1981, § 102(e) Date Jun. 29, 1981, PCT Pub. No. WO81/01424, PCT Pub. Date May 28, 1981
PCT Filed Nov. 7, 1980, Ser. No. 279,973
Claims priority, application Norway, Nov. 9, 1979, 793621
Int. Cl.³ C23F *7/06*; C25D *11/04*
U.S. Cl. 204—58 **17 Claims**



1. A process for providing a dark colored, wavelength selective oxide film on a piece of aluminum which comprises the steps of

(1) providing a piece of cleaned aluminum,

(2) providing an aqueous treatment bath which contains 1 to 100 g/l of NH_4Cl, has a temperature of between 20° and 100° C. and has a pH of 8.9 to 10.9,

(3) immersing said piece of cleaned aluminum in said aqueous treatment bath for up to 45 minutes while concurrently subjecting said piece of cleaned aluminum to an electrode potential of between −1.1 and −0.6 volts relative to a saturated calomel electrode, and

(4) removing said piece of cleaned aluminum from said aqueous treatment bath.

4,421,613
PREPARATION OF HYDROXY COMPOUNDS BY ELECTROCHEMICAL REDUCTION

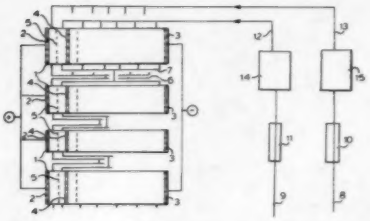
Francis Goodridge, Newcastle-upon-Tyne; Anthony J. Montgomery, Brentwood, and Alan R. Wright, Walsend, all of England, assignors to Bush Boake Allen, London, England

Continuation of Ser. No. 222,997, Jan. 6, 1981, abandoned. This application Jul. 21, 1982, Ser. No. 400,470

Claims priority, application United Kingdom, Jan. 7, 1980, 8000423

Int. Cl.³ C25B *3/04*

U.S. Cl. 204—74 **14 Claims**



1. A method for the preparation of an organic hydroxy compound of the formula ROH, wherein R represents a terpenoid group, by electrochemical reduction of a substituted hydroxylamine of the formula $RONR'_2$ wherein each R' is hydrogen or a hydrocarbon or substituted hydrocarbon group or NR'_2 represents a nitrogen-containing organic heterocyclic ring in an electrolytic cell comprising a cathode, a catholyte at a pH of from 3 to 6.5 in contact with the cathode, an anode, an anolyte in contact with the anode and a membrane separating the catholyte from the anolyte and in which the catholyte is electrically conducting and consists essentially of an organic carboxylic acid and a solution of the substituted hydroxylamine and the organic hydroxy compound is recovered from the catholyte.

4,421,614
METHOD OF BYPASSING ELECTRIC CURRENT OF ELECTROLYTIC CELLS

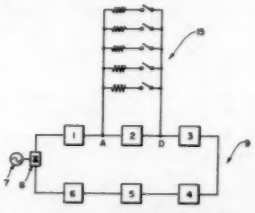
Kenzo Yamaguchi, Tokyo; Yoshinari Take, and Akiyoshi Manabe, both of Okayama, all of Japan, assignors to Chlorine Engineers Corp. Ltd., Tokyo, Japan

Filed Dec. 2, 1981, Ser. No. 326,624

Claims priority, application Japan, Dec. 3, 1980, 55-169640

Int. Cl.³ C25F *1/34, 15/00*

U.S. Cl. 204—98 **1 Claim**



1. A method of bypassing the electric current of at least one electrolytic cell in an electrolytic apparatus comprised of a plurality of electrolytic cells having an alkaline metal halogenide aqueous solution connected in series to an electrolytic power source and operating with a rated current, comprising connecting an electric current bypass unit in parallel to at least one of said electrolytic cells which is to be bypassed, said bypass unit being comprised of a plurality of series combinations of a resistor and a switch connected in parallel with each other, and closing said switches in sequence to reduce the current in said at least one electrolytic cell in a step-wise manner thereby permitting a current smaller than the current flowing during the electrolysis to flow in the same direction as the current flows during electrolysis.

4,421,615
PROCESS FOR PRODUCING METALLIC GALLIUM

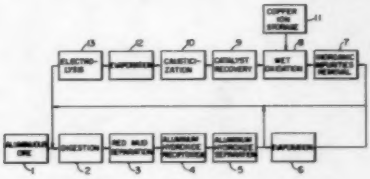
Koichi Yamada; Takuo Harato, both of Niihama; Yasuo Shinya, Seto, and Hisakatsu Kato, Niihama, all of Japan, assignors to Sumitomo Aluminium Smelting Company, Limited and Sumitomo Chemical Company, Ltd., both of Osaka, Japan

Filed Sep. 23, 1982, Ser. No. 421,838

Claims priority, application Japan, Sep. 30, 1981, 56-156467

Int. Cl.³ C25G *1/00*

U.S. Cl. 204—105 R **5 Claims**



1. A process for producing metallic gallium from a gallium-containing alkali aluminate solution circulating in the Bayer process, comprising:

(a) removing inorganic impurities from the alkali aluminate solution by cooling the solution after the aluminum hydroxide separation step in the Bayer process, thereby precipitating crystals of the inorganic impurities, and thereafter removing the precipitate from the solution;

(b) removing organic impurities from the alkali aluminate solution by means of an oxidation treatment; and

(c) subjecting the purified alkali aluminate solution thus obtained to electrolysis.

4,421,616
METHOD OF PRODUCING ZINC FROM CHLORIDE SOLUTIONS WHICH CONTAIN CHIEFLY IRON, COPPER AND ZINC

Arne Bjune, Skjetten; Gunnar H. Boe, Kristiansand, and Tore Danielssen, Vaagsbygd, all of Norway, assignors to Elkem a/s, Oslo, Norway

Continuation-in-part of Ser. No. 255,475, Apr. 20, 1981, abandoned, which is a continuation of Ser. No. 137,569, Apr. 7, 1980, abandoned. This application May 11, 1981, Ser. No. 262,299

Claims priority, application Norway, Apr. 17, 1979, 791261

Int. Cl.³ C25L *1/16*; C01G *9/00*

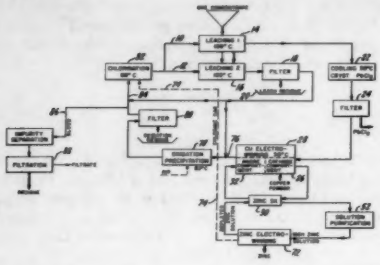
U.S. Cl. 204—115 **5 Claims**

1. Method for producing zinc metal from chloride solutions containing iron, copper and zinc by liquid-liquid extraction and electrolysis which comprises the steps of:

(a) forming a chloride solution containing iron, copper and zinc chlorides in which solution the iron chloride is essentially ferrous chloride and the copper chloride is essentially cuprous chloride,

(b) contacting said chloride solution with tri-n-butylphosphate which selectively extracts and removes zinc chloride from the ferrous chloride and cuprous chloride in said solution,

(c) separating zinc chloride from said tri-n-butylphosphate, and



(d) feeding the separated zinc chloride in aqueous solution into an electrolytic cell in which zinc metal is deposited at the cathode by electrolysis and removed from the cell.

4,421,617

PHOTOLYTIC PRODUCTION OF HYDROGEN FROM WATER

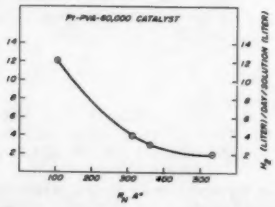
Michael Gratzel, and John Kiwi, both of Vaud, Switzerland, assignors to Engelhard Corporation, Iselin, N.J.

Division of Ser. No. 184,673, Sep. 5, 1980, Pat. No. 4,394,293. This application Sep. 21, 1982, Ser. No. 421,003

Claims priority, application United Kingdom, Sep. 8, 1979, 7931250; Jul. 8, 1980, 8022338

Int. Cl.³ B01J *19/12*

U.S. Cl. 204—157.1 R **19 Claims**



1. In the photolytic method for producing hydrogen from water by treatment with a reducing species capable of donating electrons to water, the improvement which comprises: conducting the reduction step in the presence of a stabilized and finely dispersed catalyst of particle size no greater than 500 Å which comprises one or more Noble metals in finely divided form in intimate admixture with a water permeable protective agent adsorptive to said metal and selected from the group consisting of:

(1) a homopolymer derived from an acyclic olefin of 2–3 carbon atoms substituted by hydroxy, carboxy, lower alkyleneoxy or an ester or amide derivative;

(2) a copolymer derived from the reaction of an aralkene with an unsaturated acyclic dicarboxylic acid or a lower alkylene oxide;

(3) an hydrocarbyl moiety of 10–20 carbon atoms substituted by one or more polar groups; and

(4) a polysaccharide.

4,421,618

PHOTOISOMERIZATION OF TRANS-CYCLOPROPANE-NITRILES

Kingsley Salisbury, Sittingbourne, United Kingdom, assignor to Shell Internationale Research Maatschappij B. V., The Hague, Netherlands

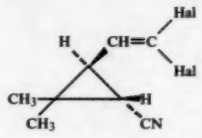
Filed Jul. 8, 1982, Ser. No. 396,428

Claims priority, application United Kingdom, Jul. 22, 1981, 8122651

Int. Cl.³ B01J *19/12*

U.S. Cl. 204—158 R **9 Claims**

1. A process for the conversion of a trans-cyclopropanenitrile of the following general formula



(I-trans)

to the corresponding cis-compound, wherein each Hal is a halogen atom, comprising:

irradiating the trans-compound (I-trans) with light of wavelength in the range 260 to 450 nanometers in the presence of a photosensitizer the triplet state energy of which is in the range 220 to 330 kilojoules per mole.

4,421,619

ACRYLIC PLASTISOLS AND ORGANOSOLS AND PHOTOSENSITIVE COMPOSITIONS AND ELEMENTS MADE THEREFROM

Boynton Graham, Wilmington, Del., assignor to E. I. Du Pont de Nemours & Co., Wilmington, Del.

Division of Ser. No. 952,467, Oct. 18, 1978, Pat. No. 4,309,331, which is a continuation of Ser. No. 780,085, Mar. 22, 1977, abandoned. This application Nov. 2, 1981, Ser. No. 317,365

Int. Cl.³ C08F *2/50;* **C08J** *3/28*

U.S. Cl. 204—159.16 **9 Claims**

1. A composition containing thermally coalescible acrylic resin plastisol or organosol dispersion comprising particles having a mean diameter in the range of 0.1 to 20 μm of a single-phase, surfactant-free, homopolymer, random bipolymer or tripolymer of acrylic monomer(s) selected from the group consisting of ethylacrylate, methyl methacrylate and methacrylic acid dispersed in a surfactant-free medium that comprises a compatible liquid plasticizer that is nonvolatile at room temperature and is not a monomer of any of the polymeric components, the weight ratio of said particles to said plasticizer being from 40/60 to 90/10, and, in addition, a nonvolatile photopolymerizable ethylenically unsaturated monomeric compound which is not a monomer of any of the polymeric components and at least one photoinitiator.

4,421,620

PROCESS FOR PRETREATING AND COATING METALLIC SUBSTRATES ELECTROPHORETICALLY

Alan J. Kaylo, Glenshaw, and Nicholas T. Castellucci, Pittsburgh, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Feb. 11, 1982, Ser. No. 347,844

Int. Cl.³ C25D *13/06, 13/08, 13/20*

U.S. Cl. 204—181 C **10 Claims**

1. A process for preparing a corrosion-resistant metallic substrate; said process comprises steps of:

(i) passing an electric current between the substrate, acting as an anode, and a cathode, in contact with an electrophoretic composition; followed by

(ii) passing an electric current between the substrate, acting as a cathode, and an anode, in contact with the electrophoretic composition;

the electrophoretic composition comprises an aqueous dispersion of a composition of matter containing a cationic salt and an ungelled reaction product of:

(a) an epoxy material;

(b) a tannin.

4,421,621

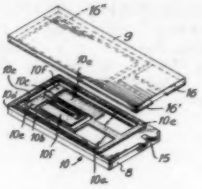
QUARTZ CRYSTAL OSCILLATOR

Hiroyuki Fujii, Suwa; Joji Shimakawa, Minowa; Yukio Hara, Minowa, and Masatoshi Kobayashi, Minowa, all of Japan, assignors to Kabushiki Kaisha Suwa Seikosha, Tokyo and Matsushimakogyo Kabushiki Kaisha, Nagano, both of, Japan

Division of Ser. No. 58,331, Jul. 17, 1979, abandoned. This application Oct. 1, 1981, Ser. No. 307,692

Int. Cl.³ C23C *15/00*

U.S. Cl. 204—192 C **11 Claims**



1. A method for manufacturing a quartz crystal oscillator comprising:

forming a quartz crystal vibrator plate having first and second opposed substantially planar surfaces, said plate defining a tuning fork vibrator having a base, two vibratory tines extending from the base and a frame integrally extending from the base and surrounding the tines and through means in the base of said plate for electrically connecting electrodes on one surface of said vibrator to the opposed surface;

disposing thin-film surface electrodes on said surfaces of each tine;

placing said vibrator between a pair of cooperating case members, one of said case members having two external oscillator electrodes disposed on the same surface;

sealing said vibrator between said case members in the region of the base and frame; and

disposing a coupling electrode in said through means.

4,421,622

METHOD OF MAKING SPUTTERED COATINGS

Dennis R. Hollars, Franklin, Tenn., assignor to Advanced Coating Technology, Inc., Franklin, Tenn.

Filed Sep. 20, 1982, Ser. No. 419,988

Int. Cl.³ C23C *15/00*

U.S. Cl. 204—192 P **14 Claims**

1. A method of making a low emissivity architectural glass panel comprising:

(a) depositing a silver film on a substrate, said silver film having a resistivity of from 2 to 20 ohms per square;

(b) reactively sputtering a metal oxide film over said silver film comprising:

(i) providing a low pressure atmosphere containing a predetermined amount of oxygen and an ionizing gas;

(ii) establishing a plasma in the atmosphere adjacent a sputtering target formed of said metal;

(iii) reacting the target metal with the oxygen to form a stoichiometric metal oxide coating on the substrate;

(iv) depositing a first film layer of stoichiometric metal oxide on said substrate having a thickness of from 20–80 angstroms;

(v) discontinuing exposure of said first oxide film to the plasma for at least a brief interval; and,

(vi) depositing a second film layer of said stoichiometric metal oxide on said substrate.

4,421,623

APPARATUS FOR GUIDING MATERIAL IN STRIP FORM

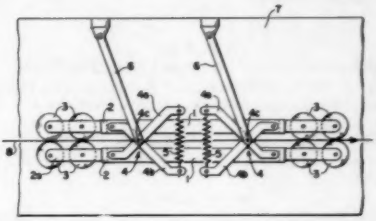
Friedbert Koch, Witten, and Bernhard Schweinsberg, Bochum, both of Fed. Rep. of Germany, assignors to C. Otto & Comp. G.m.b.H., Bochum, Fed. Rep. of Germany

Filed Nov. 22, 1982, Ser. No. 444,049

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1981, 3146850

Int. Cl.³ C25D *17/00*

U.S. Cl. 204—206 **7 Claims**



1. Apparatus for guiding a strip between equally-spaced electrodes, a tank in which said electrodes are supported, the combination therewith of said apparatus which comprises:

frames made of electrically-insulated material for supporting said electrodes at opposite sides of the strip,

pairs of rollers supported by said frames at opposite ends of said electrodes for passing the strip therebetween,

pivot means for holding together said frames and thereby positioning said electrodes in a generally parallel relation to movement of the strip therebetween,

tensioning means for applying pressure to said frames to urge said rollers into contact with the strip, and

support arms interconnecting said tank and said pivot means to permit movement of the frames without disturbing the relative position of said electrodes.

4,421,624

APPARATUS FOR CONTINUOUSLY PROCESSING A BAND-SHAPE MATERIAL

Yasuo Kimoto, Fujiidera; Masahiko Yamamoto, Nishinomiya; Katsunori Tamiya, Kobe; Yoshihito Sakai, Sakai; Akio Komura; Shoichi Honda, both of Osaka; Hidehiko Machata, Suita; Hiroshi Kamada, Takatsuki; Tomohiko Suzaki, Ibaraki, and Tomoya Inoue, Kawasaki, all of Japan, assignors to Hitachi Shipbuilding & Engineering Co., Ltd., Osaka, Japan

Filed Mar. 17, 1981, Ser. No. 244,619

Claims priority, application Japan, Mar. 25, 1980, 55-38488; Mar. 25, 1980, 55-38489; Mar. 25, 1980, 55-38490; Mar. 25, 1980, 55-38491; Mar. 25, 1980, 55-38492; Mar. 25, 1980, 55-39776[U]; Mar. 31, 1980, 55-42684

Int. Cl.³ C25D *17/00, 21/10*

U.S. Cl. 204—209 **10 Claims**

1. An apparatus for continuously processing a band-shape material comprising;

transverse sliding shafts disposed on a base table,

a basal board which freely slides transversely along said transverse sliding shafts,

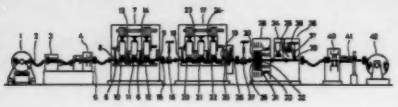
transverse-feeding means by which said basal board is quickly and/or slowly moved transversely,

vertical sliding shafts disposed on said basal board,

a tool of abrasion in combination with electrolytic polishing

which freely slides vertically along said vertical sliding shafts,

vertical-feeding means by which said tool is moved vertically against said basal board, and



a polishing head which is disposed on said tool and composed of electrodes for electrolysis and abrasive matters for abrasion and by which continuously sent band-shape material is polished.

4,421,625

LOWER PART OF A FUSED SALT ELECTROLYTIC CELL

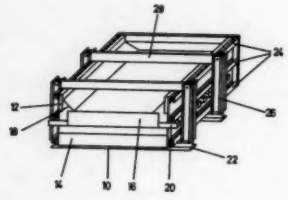
Werner K. Fischer, Venthone, and Ernst Bosshard, Fällanden, both of Switzerland, assignors to Swiss Aluminum Ltd., Chippis, Switzerland

Filed May 14, 1982, Ser. No. 378,238

Claims priority, application Switzerland, May 20, 1981, 3287/81

Int. Cl.³ C25C *3/00*

U.S. Cl. 204—243 R 21 Claims



1. In an electrolytic cell used in the production of aluminum comprising an outer steel tank, a thermal insulating layer and an electrically conductive inner carbon lining, the improvement which comprises a metal framework for supporting the lower portion of said cell comprising:

at least one side section on the longitudinal sides of said cell and running the full length thereof;

a plurality of cradles enclosing said side section, each of said cradles having a lower supporting section running under said cell, an upper bracing section running over said cell and a pair of side posts on either longitudinal side of said cell, each of said posts being secured to one end of said lower supporting section and said upper bracing section; and

means associated with said cradles and said side section for counteracting the forces produced in said cell.

4,421,626

BINDING LAYER FOR LOW OVERVOLTAGE HYDROGEN CATHODES

John Z. O. Stachurski, Amherst; Dirk Pouli, Williamsville; John A. Ripa, Lancaster, and Gerald F. Pokrzyk, Lewiston, all of N.Y., assignors to Occidental Chemical Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 104,235, Dec. 17, 1979, Pat. No. 4,354,915. This application Jul. 20, 1981, Ser. No. 284,851

The portion of the term of this patent subsequent to Oct. 19, 1999, has been disclaimed.

Int. Cl.³ C25B *11/06*

U.S. Cl. 204—290 R 7 Claims

1. A cathode for use in electrolytic processes comprising a substrate material, an intermediate binding layer applied to the substrate, and a surface layer applied to the binding layer, said surface layer comprising a codeposit of a first metal selected from the group consisting of iron, cobalt, nickel, and mixtures thereof, a second metal or metal oxide selected from the group consisting of molybdenum, manganese, titanium, tungsten, vanadium, indium, chromium, their oxides and combinations thereof, and from about 0.5 to about 25 atomic percent of a substantially nonleachable third metal selected from the group consisting of cadmium, mercury, lead, thallium, bismuth, and mixtures thereof, said intermediate binding layer comprising a codeposit of said first metal and said second metal or metal oxide applied to the substrate from an electroplating solution containing an alkali metal thiocyanate or thiourea.

4,421,627

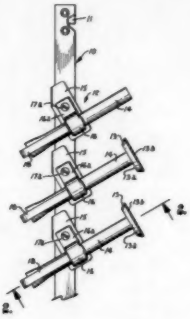
ARTICLE HOLDER FOR ELECTROPLATING PROCESS

Marc LeBaron, Lincoln, Nebr., assignor to Lincoln Plating Company, Lincoln, Nebr.

Filed May 24, 1982, Ser. No. 381,410

Int. Cl.³ C25D *17/08*

U.S. Cl. 204—297 W 8 Claims



1. Apparatus for use in an electroplating bath, comprising:

an electrically conductive hanger bar for immersion in the bath and having a major lengthwise upright axis;

a plurality of article holders secured to said hanger bar and spaced at intervals along said bar;

each said article holder comprising an electrically non-conductive hollow tube open at both ends and having a tube axis;

each said tube arranged so that the tube axis is oriented at an acute angle with respect to the bar axis thus to define an upper and lower end for each tube;

an electrical connector extending between said bar and into the inside lower end of each tube through the open lower end, said connector covered against contact with the bath except inside the tube;

said tube adapted to receive through its upper end a stem of an article to be electroplated with the stem in electrical contact with the connector inside the tube; and

means providing access to the interior of the tube by the bath liquid through the upper and lower ends of said tubes.

4,421,628

RECTANGULAR TARGET PLATE FOR CATHODE SPUTTERING APPARATUS

Hans Quaderer, Schaan, Liechtenstein, assignor to Balzers Aktiengesellschaft, Liechtenstein

Filed Mar. 15, 1983, Ser. No. 475,479

Claims priority, application Switzerland, Mar. 22, 1982, 1735/82

Int. Cl.³ C23C *15/00*

U.S. Cl. 204—298 2 Claims

1. A target for cathode sputtering apparatus, comprising a

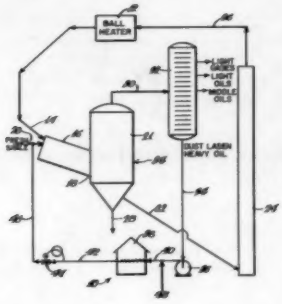
rectangular plate having a surface to be sputtered with a longitudinally elongated groove therein, a plurality of recesses located in the groove at spaced locations and intended for securing purposes being located along a center line extending parallel to the longer side of said surface, the recesses being provided in the bottom of said groove and extending along the center line of said plate.

4,421,629

DELAYED COKING AND DEDUSTING PROCESS

Earl D. York, Engelwood, Colo.; Kamil F. Rustam, Naperville, and Robert D. Hall, Wheaton, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Jun. 8, 1981, Ser. No. 271,570
Int. Cl.³ C10G *1/00*; C10B *53/00*
U.S. Cl. 208—8 R **20 Claims**



1. A process for use in making synthetic fuels, comprising the steps of:

introducing said hydrocarbon-containing material into a retort;

introducing solid heat carrier material into said retort;

retorting said solid hydrocarbon-containing material by contacting said solid hydrocarbon-containing material with said solid heat carrier material at a sufficient retorting temperature in said retort to liberate an effluent product stream of hydrocarbons containing entrained particulates derived from said solid hydrocarbon-containing material;

separating a dust laden oil fraction containing normally liquid oil and a substantial portion of said entrained particulates from said effluent product stream;

pumping said dust laden oil fraction through a furnace, via a furnace inlet line and a furnace outlet line;

substantially minimizing coking and buildup of carbon in said furnace and said furnace outlet line by injecting steam into said dust laden oil fraction in said furnace inlet line in a sufficient amount to increase the velocity of said dust laden oil fraction through said furnace without substantially stripping said hydrocarbons from said dust laden oil fraction;

substantially minimizing the amount, rate and temperature of solid heat carrier material being introduced into said retort by heating said dust laden oil fraction at a pressure to minimize vaporization of said normally liquid oil in said furnace and at a temperature ranging from 800° F. to less than the retorting temperature in said retort, after said steam has been injected into said dust laden oil fraction;

feeding all of said dust laden oil fraction to said retort after said dust laden oil fraction has been heated in said furnace; and thereafter,

thermal cracking said dust laden oil fraction in said retort by contacting said entire dust laden oil fraction with said solid heat carrier material in said retort to liberate lighter hydrocarbons from said oil fraction and form a coked residual material having a greater concentration of said particulates than said dust laden oil fraction.

4,421,630

PROCESS FOR COAL LIQUEFACTION IN STAGED DISSOLVERS

George W. Roberts, Emmaus; Edwin N. Givens, Bethlehem, and Ronald W. Skinner, Allentown, all of Pa., assignors to International Coal Refining Company, Allentown, Pa.

Filed Oct. 5, 1981, Ser. No. 308,639
Int. Cl.³ C10G *1/00*
U.S. Cl. 208—8 LE **15 Claims**

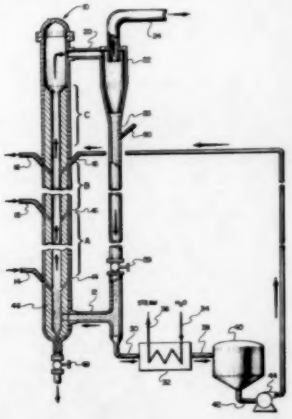
1. In a process for the solvent refining of coal wherein a slurry of finely ground coal in recycle process solvent is passed through a preheater to a coal liquefaction stage in the presence of hydrogen-rich gases at elevated temperatures and pressures, the improvement wherein said coal liquefaction stage comprises passing the slurry from the preheater in series through a first dissolver and a second dissolver, the process being controlled so that said first dissolver is operated at a higher temperature than said second dissolver, said first and second dissolvers not containing a fixed or ebullated catalyst bed and being operated in an adiabatic mode without the addition of significant external heat, the higher operating temperature of said first dissolver being more favorable for the liquefaction reactions of desulfurization and solvent production, and the lower operating temperature of said second dissolver being more favorable thermodynamically for solvent hydrogenation.

4,421,631

HYDROCARBON TREATMENT PROCESS

Jaime P. Ampaya, Thousand Oaks; Laszlo A. Heredy, Canoga Park, and Arthur L. Kohl, Woodland Hills, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 2, 1981, Ser. No. 308,079
Int. Cl.³ C10G *9/34*
U.S. Cl. 208—8 R **12 Claims**



1. A continuous process for treating a hydrocarbon material in the presence of a molten salt wherein the improvement comprises the sequential steps of:

introducing a molten salt containing carbon into a heat generation zone located in a lower portion of an upwardly extending, elongated reactor, said reactor comprising a single continuous chamber;

introducing a source of oxygen into said lower portion of said reactor in an amount sufficient to react with said

carbon and heat said molten salt to a temperature of at least 700° C. while forming gaseous combustion products;

flowing the resulting mixture of gaseous combustion products and heated molten salt upwardly through said reactor with a gas phase velocity of at least 1.5 meters per second to a hydrocarbon material reaction zone located above said heat generation zone;

introducing the hydrocarbon material to be treated into said reaction zone to produce gaseous reaction products and unreacted carbon entrained in said flowing molten salt;

reducing the temperature of said molten salt to less than about 650° C.;

withdrawing said molten salt from said reaction zone and said reactor, and introducing it into a gas removal zone and separating gaseous reaction product therefrom;

withdrawing molten salt containing unreacted entrained carbon from said gas removal zone and returning it to said heat generation zone.

4,421,632

PROCESS FOR HYDROGENATION OF COAL

Helmut Würfel, Zur Wolfsfels 21, 6685 Blieskastel, Fed. Rep. of Germany

Filed Sep. 4, 1980, Ser. No. 183,797
Int. Cl.³ C10G *1/06*
U.S. Cl. 208—10 **11 Claims**

1. Process for the hydrogenation of coal in which substantially undried coal is mixed with emulsifier oil to form a slurry, the coal slurry is pumped to reaction pressure, heated and subjected to catalytically accelerated hydrogenation in the presence of hydrogen in a hydrogenation reactor, characterized in that at least a portion of the hot product gases occurring in the hydrogenation reactor are separately drawn off from the reactor without cooling and directly communicated for admixture with coal slurry which has been pumped to reaction pressure, direct heat exchange between the hot product gases and the coal slurry causing the condensation heat of said hot product gases to be released to the coal slurry, said released heat being sufficient to heat, dry and at least partially degasify the coal slurry, and that the gases are separated from the resultant mixture consisting of gases, liquids and solids, and that the remaining product consisting of solids and liquids are directly communicated to the reactor for hydrogenation.

4,421,633

LOW PRESSURE CYCLIC HYDROCRACKING PROCESS USING MULTI-CATALYST BED REACTOR FOR HEAVY LIQUIDS

Stuart S. Shih, and Donald Milstein, both of Cherry Hill, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 13, 1981, Ser. No. 243,414
Int. Cl.³ C10G *69/02, 45/08, 47/04*
U.S. Cl. 208—59 **9 Claims**

1. A catalytic hydrocracking process for direct conversion at low pressure of high-boiling point residua, comprising heteroatoms, metals, sulfur and asphaltenes, to distillate and naphtha, said process comprising cyclic operation of a multi-catalyst bed reactor, containing large-pore catalysts and small-pore catalysts which are Al_2O_3 impregnated with tungsten and nickel oxides, said large-pore catalysts having a pore size distribution which is characterized by the majority of pores therein being larger than 100 Angstroms in diameter, and said small-pore catalysts having a pore size distribution which is characterized by substantially all pores therein being no more than 80 Angstroms in diameter, wherein said small-pore catalysts have about twice as much NiO and WO_3 as said large-pore ctalysts, have a surface area which is about the surface area of said large-pore catalysts, have a pore volume which is about 70% of the pore volume of said large-pore catalysts, and have an average pore diameter that is about 1/3 of the average pore diameter of said large-pore catalysts, at a pressure of 200–1000 psig, a temperature of 700°–900° F., and a LHSV of 0.1-1-10 by admixing said process-generated distillate, after recycling thereof, with said residua to form solvent-diluted residua and then catalytically hydrocracking, demetalizing, desulfurizing, and decarbonizing said solvent-diluted residua in a single pass-through operation through said reactor in which said large-pore catalysts and said small-pore catalysts are sequentially contacted, said recycled process-generated distillate boiling at about 400°–700° F., so that said operation

(1) converts said high-boiling point residua to low-boiling point hydrocarbons by forming said distillate and said naphtha while removing said heteroatoms, said metals, and carbon residuals from said high-boiling point residua;

(2) hydrodesulfurizes said high-boiling point residua; and

(3) minimizes metals deposition on said catalysts and blocking of said catalysts pores by said asphaltenes, whereby said catalysts remain usable for runs of commercially acceptable length.

4,421,634

CATALYTIC DEWAXING WITH A HYDROGEN FORM ZEOLITE L CATALYST

Christopher Olavesen, Sarnia, Canada, assignor to Exxon Research and Engineering Co., Florham Park, N.J.

Continuation of Ser. No. 381,225, May 24, 1982, abandoned, which is a continuation of Ser. No. 865,956, Dec. 30, 1977, abandoned, which is a continuation-in-part of Ser. No. 781,884, Mar. 28, 1977, abandoned. This application Feb. 25, 1983, Ser. No. 469,932
Int. Cl.³ C10G *45/54, 45/64*
U.S. Cl. 208—111 **31 Claims**

1. A process for catalytically dewaxing an asphalt free, wax-containing hydrocarbon oil which comprises contacting said oil at elevated temperature and pressure and in the presence of hydrogen with a catalyst comprising a Zeolite L crystalline alumino-silicate that has been partially decationized to the hydrogen form and which contains at least one catalytic metal component selected from the group consisting of Group VI and Group VIII metals, their oxides, sulfides and mixtures thereof, to hydrocrack the wax components of said oil in preference over the oil components of said oil to hydrocarbons boiling below the initial boiling point of the oil and recovering an oil having a reduced wax content and reduced pour point.

4,421,635

PROCESS FOR SIMULTANEOUSLY CRACKING HEAVY HYDROCARBONS INTO LIGHT OILS AND PRODUCING HYDROGEN

Tadashi Murakami, Kurashiki; Teruo Suzuka, Toda; Yukio Inoue, Toda, and Shirou Aizawa, Toda, all of Japan, assignors to Research Association for Residual Oil Processing, Tokyo, Japan

Filed Feb. 12, 1982, Ser. No. 348,542
Claims priority, application Japan, Feb. 13, 1981, 56-20708
Int. Cl.³ C10G *47/04, 11/04*
U.S. Cl. 208—112 **4 Claims**

1. A process for simultaneously cracking heavy hydrocarbons to form light oils and producing hydrogen, which comprises

a first step wherein steam and heavy hydrocarbons are simultaneously contacted with a catalyst in a reduced state, containing at least 30% by weight iron in the form of iron oxide, at a temperature of from 500° to 800° C., to produce hydrogen, cracked gases, and cracked light oils, to convert the reduced-state catalyst into an oxidized-state catalyst, and to deposit coke on the catalyst, and

a second step wherein the oxidized-state catalyst with the coke deposited thereon is contacted with an oxygen-containing gas insufficient for achieving complete combustion of the coke, at a temperature of from 750° to 950° C., to partially combust the coke on the catalyst, to convert the oxidized-state catalyst into a reduced-state catalyst, and to fix a sulfur compound contained in the coke as iron sulfide

with a part of the reduced-state catalyst, wherein the improvement comprises that:

(1) a major portion of the catalyst is recycled between the first step and second step; and

(2) there is provided a third step wherein a part of the reduced-state, iron sulfide-containing catalyst formed in the second step is contacted with an oxygen-containing gas in a reducing atmosphere at a temperature of from 600° to 1,000° C. to effect combustion of iron sulfide in the catalyst, the catalyst after combustion being recycled to the second step or the first step, or to both the second and first steps.

4,421,636

INERT GAS ENRICHMENT IN FCC UNIT REGENERATORS

Michael J. Dolan, Laurel Springs; Stephen J. McGovern, Deptford, and Peter J. Owens, West Deptford, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 298,404, Sep. 1, 1981, Pat. No. 4,395,325. This application Apr. 9, 1982, Ser. No. 366,951

Int. Cl.³ C10G *11/18*; B01J *37/14*

U.S. Cl. 208—113 **12 Claims**

1. In a catalytic cracking process comprising:

contacting a hydrocarbonaceous feed with a cracking catalyst to produce cracked hydrocarbon vapors and deactivated catalyst containing carbonaceous deposits;

separating the deactivated catalyst from the hydrocarbon vapors and conducting the deactivated catalyst to a regeneration vessel;

regenerating the deactivated catalyst under fluidized bed conditions in the regeneration vessel by means of an oxygen-containing gas introduced into the regeneration vessel, thereby forming a flue gas comprising oxygen, sulfur dioxide, sulfur trioxide, carbon monoxide and carbon dioxide;

the improvement wherein the oxygen-containing gas is admixed with a stream of an inert gas, prior to the introduction of the oxygen-containing gas into the regeneration vessel, in the amount sufficient to maintain apparent catalyst bed density in the regeneration vessel at about 10 to about 30 lbs/ft^3 and the amount of the oxygen content in the flue gas at about 0 to about 1 mole percent.

4,421,637

CATALYTIC CRACKING PROCESS WITH SIMULTANEOUS PRODUCTION OF A LOW BTU FUEL GAS AND CATALYST REGENERATION

Dane C. Grenoble, Baton Rouge, La., and Walter Weissman, Berkeley Heights, N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

Continuation-in-part of Ser. No. 203,139, Nov. 3, 1980, abandoned, which is a continuation-in-part of Ser. No. 927,830, Jul. 25, 1978, Pat. No. 4,244,811. This application Dec. 18, 1981, Ser. No. 332,161

The portion of the term of this patent subsequent to Jan. 13, 1998, has been disclaimed.

Int. Cl.³ C10G *11/04*

U.S. Cl. 208—120 **16 Claims**

1. A process for catalytically cracking a hydrocarbon feed and simultaneously generating a low BTU gas or hydrogen rich gas, said process comprising the steps of:

(1) contacting, in a cracking zone and at elevated temperature, a hydrocarbon feed with an acid catalyst comprising a catalytic metal oxide component wherein said metal is selected from the group consisting of (a) tungsten, niobium and mixtures thereof, and (b) mixtures of (a) with tantalum, hafnium, chromium, titanium, zirconium and mixtures thereof, said metal oxide component being supported on a silica-containing inorganic refractory metal oxide support having a silica content of less than 50 wt.% of the total support, for a time sufficient to effect the desired cracking of the feed and yield a coked catalyst, said catalyst being steamed at a temperature of at least 600° C. prior to use;

(2) regenerating the coked catalyst at regenerating conditions by contacting same with steam, an O_2-containing gas or mixture thereof to produce a regenerated catalyst and a gas consisting of an H_2 rich gas, a low BTU gas rich in CO and a combination thereof; and

(3) recirculating the regenerated catalyst of step (2) back to the cracking zone of step (1).

4,421,638

DEMETALLIZATION OF HEAVY OILS

Simon G. Kukes; Marvin M. Johnson and Gerhard P. Nowack, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 31, 1983, Ser. No. 481,085

Int. Cl.³ C10G *29/02*

U.S. Cl. 208—251 R **10 Claims**

1. A method for treating metal containing hydrocarbon feed streams comprising contacting said hydrocarbon feed stream with an amount of a phosphorus sulfide of at least about 0.5 weight percent based on the weight of the hydrocarbon containing feed stream at demetallizing temperatures and pressures sufficient to convert said metals to oil insoluble compounds.

4,421,639

RECOVERY OF DEASPHALTING SOLVENT

John S. Lambert, New Providence, N.J., and Joseph W. Gleitsmann, deceased, late of Springfield, N.J. (by Virginia E. Gleitsmann, executrix), assignors to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed Jul. 27, 1982, Ser. No. 402,447

Int. Cl.³ C10G *21/00, 21/28*

U.S. Cl. 208—309 **21 Claims**

1. An energy-efficient continuous process for solvent deasphalting a viscous hydrocarbon oil and recovering the solvent, which comprises:

(a) contacting said viscous hydrocarbon oil with a deasphalting solvent under deasphalting conditions of temperature and pressure in a primary fractionator (12);

(b) withdrawing the primary raffinate from the primary fractionator (12) and feeding said primary raffinate to a secondary fractionator (20);

(c) contacting said primary raffinate of step (b) with a deasphalting solvent under deasphalting conditions of temperature and pressure in said secondary fractionator (20);

(d) withdrawing the secondary extract from said secondary fractionator (20) and feeding said secondary extract to a secondary fractionator overhead exchanger (28) and then to a secondary high pressure flash tower (54);

(e) withdrawing asphalt mix from said secondary fractionator (20) and feeding said asphalt mix to an asphalt recovery section;

(f) withdrawing the primary extract from the primary fractionator (12) and feeding said primary extract to a primary fractionator overhead exchanger (24) and then to a primary steam heater (26) and then to a primary clarifier (16) operated at conditions above the critical temperature and pressure of the deasphalting solvent;

(g) withdrawing the light phase from said primary clarifier (16) and using said light phase to heat the primary extract in the primary fractionator overhead exchanger (24) and then to heat and evaporate deasphalting solvent in said secondary extract of step (d) in the secondary fractionator overhead exchanger (28);

(h) withdrawing the heavy phase from said primary clarifier (16) and heating said heavy phase to evaporate deasphalting solvent in a primary mix evaporator (32);

(i) withdrawing the deasphalting solvent vapor from said primary mix evaporator (32) and feeding said deasphalting solvent vapor to a secondary pressure vapor heat exchanger (36) where said deasphalting solvent vapor is condensed;

(j) withdrawing said deasphalting solvent from said secondary pressure vapor heat exchanger (36) and storing said deasphalting solvent in a high pressure solvent accumulator (18) and recycling said deasphalting solvent to the primary fractionator (12) and to the secondary fractionator (20);

(k) withdrawing the deasphalting solvent vapor from the secondary high pressure flash tower (54) and feeding the deasphalting solvent vapor to a secondary pressure vapor heat exchanger (36) where the deasphalting solvent is condensed and storing said deasphalting solvent in the high pressure solvent accumulator (18) and recycling said deasphalting solvent to the primary fractionator (12) and to the secondary fractionator (20);

(l) withdrawing the secondary mix from the secondary high pressure flash tower (54) and feeding said secondary mix to the secondary pressure vapor heat exchanger (36) and then to a secondary low pressure flash tower (56);

withdrawing the secondary mix from the secondary low pressure flash tower (56) and feeding said secondary mix to a secondary reboiler (57); and,

(n) withdrawing the deasphalting solvent vapor from said secondary low pressure flash tower (56) and condensing the deasphalting solvent vapor in a secondary solvent condenser (68) and storing said deasphalting solvent in a low pressure solvent accumulator (70) and recycling the deasphalting solvent to the secondary fractionator (20).

4,421,640

METHODS FOR SEPARATING HYDROCARBONS BY LIQUID EXTRACTION

James M. Watson, Big Spring, Tex.; Jacques F. J. Grootjans, Leefdaal, and Luc F. L. N. Delorme, Brussels, both of Belgium, assignors to Cosden Technology, Inc., Dallas, Tex.

Filed Feb. 16, 1982, Ser. No. 349,398

Int. Cl.³ C10G *21/20*

U.S. Cl. 208—326 **5 Claims**

1. A process for treating a hydrocarbon mixture to selectively separate the aromatic and paraffinic components thereof which comprises mixing said hydrocarbon mixture with a selective solvent consisting essentially of N-(2-hydroxyethyl)-2-pyrrolidone containing a minor amount of water at a temperature in the range of from about 107° C. to about 162° C. under pressure of from about 586 kilopascals to about 2137 kilopascals, separating the resultant mixture into two phases to obtain a raffinate phase and an extract phase, the latter being rich in the aromatic hydrocarbon components of said hydrocarbon mixture.

4,421,641

ENRICHMENT PROCESS BY FLOTATION OF PHOSPHATE-CONTAINING ORES WITH CARBONATED AND/OR SILICEOUS GANGUES, BY AMPHOTERIC COLLECTING AGENTS

Pierre Blazy, Nancy; Robert Houot, Villers les Nancy; Robert Joussemet, Mazerulles; Philippe Haïcour, Paris, and Jean Tracez, Sceaux, all of France, assignors to Ceca S.A., Velizy Villacoublay, France

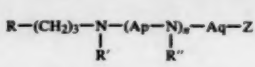
Filed Dec. 31, 1981, Ser. No. 336,451

Claims priority, application France, Jan. 5, 1981, 81 00052

Int. Cl.³ B03D *1/14*

U.S. Cl. 209—166 **1 Claim**

1. Enrichment process by flotation of sedimentary ores containing phosphate and a gangue comprising both carbonated and siliceous materials, wherein two successive flotations are carried out choosing two different pH for the medium, and using the same collecting agent to float out the gangues, one flotation being carried out in a basic medium to float out carbonates and one flotation in an acid medium to float out silicates, the collecting agent used having the formula



in which formula:

R is of form R_1 or R_1O—, R_1 being a saturated or unsaturated alkyl radical, either linear or branched, and comprising between 15 and 19 carbon atoms; —R′ and R″ are H or —Aq—Z, bearing in mind that for R″, when n is greater than 1, there can be in the molecule simultaneously radicals H and radicals —Aq—Z;

Ap and Aq are polymethylene chains containing between 1 and 4 carbon atoms;

n is a number equal to 0 or an integer between 1 and 5;

Z is a radical selected from the carboxylic, the sulphonic and the phosphonic radicals.

4,421,642

DEVICE FOR SEPARATING GRINDING MEDIUM AND MILLED SUSPENSION IN A WET COMMINUTING MACHINE

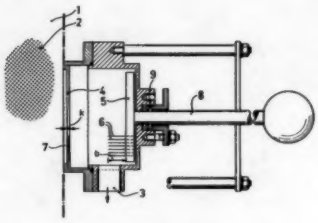
Ludwig Kreitner, Heppenheim; Juergen Klapper, Maxdorf, and Horst Schober, Otterberg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed Jan. 28, 1982, Ser. No. 343,761

Claims priority, application Fed. Rep. of Germany, Feb. 4, 1981, 3103662

Int. Cl.³ B07B *1/52*

U.S. Cl. 209—384 **3 Claims**



1. A device for separating grinding medium from milled suspension in a wet comminuting machine, having a sieve which is located at the mill base outlet of the machine and has orifices of such dimensions that they block the passage of grinding medium, wherein said outlet comprises a plate which carries, on the side facing the sieve, elements arranged in alignment with the orifices of the sieve, said plate and said elements being normally in a location opposite, but remote from, the exit face of said sieve, and means being provided for mounting said plate for reciprocating movement towards and away from said sieve to permit said elements to be pushed, intermittently, through the orifices of the sieve for cleaning said orifices.

4,421,643

SWIMMING POOL FILTERING SYSTEM

Stanley H. Frederick, Ramsey, N.J., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Continuation of Ser. No. 742,387, Nov. 16, 1976, abandoned, which is a continuation of Ser. No. 627,179, Oct. 30, 1975, abandoned. This application Sep. 29, 1978, Ser. No. 946,979

Int. Cl.³ E04H *3/20*

U.S. Cl. 210—138 **6 Claims**

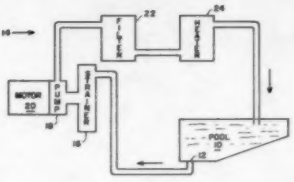
1. A swimming pool filter system, comprising:

a closed water circulating system having an inlet for receiving water from said pool and an outlet for discharging water into said pool at a point below the normal water level;

a filter connected in said closed water circulating system for filtering pool water, said filter and closed water circulating system defining a variable system head curve dependent upon the particular condition of said filter when said water circulating system is primed with water;

a centrifugal liquid pump connected in said closed water circulating system;

a motor closely coupled to said pump, said motor being capable of operating at at least two speeds for driving said pump to produce at least two different pool water circulation rates through said water circulating system in accordance with the instantaneous system head curve for a water primed system, one of said motor speeds being sufficiently high to produce a head that will prime the



water circulating system, the other of said motor speeds being lower than said one speed and sufficient to provide a low water circulation rate through said water circulating system but not to prime said system; and

switch means for selecting a motor speed to thereby achieve a water circulation rate in accordance with the system head curve so that the most efficient circulation rate required to maintain a desired degree of pool water clarity may be selected thereby providing a more efficient filter system and for selecting said one speed when the water circulating system must be primed.

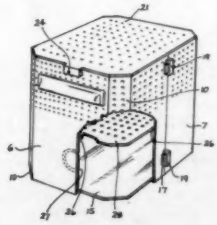
4. A swimming pool filter system as described in claim 1, wherein the switch means includes a timer means for automatically selecting preset motor speeds during selected periods of time.

4,421,644

FILTER HOUSING

Laurence R. Gedye, Doncaster East, Australia, assignor to L.R. & N.R. Gedye Pty. Limited, Australia

Filed Aug. 17, 1981, Ser. No. 293,086
Claims priority, application Australia, Aug. 15, 1980, PE5057
Int. Cl.³ B01D *35/02*
U.S. Cl. 210—233 **6 Claims**



1. A filter unit having a filter housing adapted to be erected from a flat blank and disassembled to said flat blank, comprising a plurality of side walls and two opposite end walls defining a housing, said end and side walls being moulded as a one-piece flat blank having fold lines dividing said one-piece moulded blank into said side and end walls, said blank comprising a generally rectangular main panel having at least three parallel fold lines formed in one face thereof and extending transversely across said one face between opposite longitudinal edges thereof, said main panel being foldable along said fold lines to form the side walls of the filter housing, engageable latching elements adjacent each end of the main panel and adapted to be engaged to maintain the main panel folded to form said side walls of the filter housing, said latching elements being disengageable so that the filter housing may be knocked down into a flattened condition, two end panels each of a shape corresponding to the cross-section of the filter housing, said end panels being formed integral with the main panel on respective longitudinal edges thereof, a longitudinal fold line formed along the junction between the main panel and each of the respective end panels, the end panels being foldable along said respective fold lines forming the opposite end walls of the filter housing, said main panel and end panels being interlocked in the folded condition to constitute the filter housing, a division panel having perforations therein supported within the housing on lugs formed integral with the main panel and extending inwardly from respective side walls of the housing, said division panel being adapted to divide the interior of the housing into first and second chambers, perforations in at least one wall forming the first chamber to permit entry of liquid to the first chamber, and a filter element in the first chamber through which liquid entering the first chamber passes as it flows from the first chamber to the second chamber through the perforated division panel.

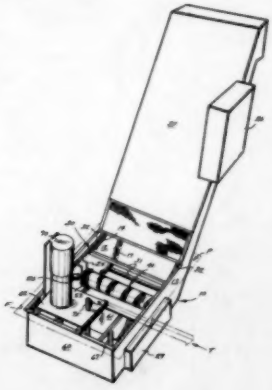
6. A filter unit as claimed in claim 1 including at least one annular shaped weakened area in one side wall, whereby upon fracturing said weakened area an aperture is formed in said side wall to communicate with the second chamber.

4,421,645

COMPACT UNIVERSAL DRUM FILTER SETTLER

John L. Creps, Rudolph, Ohio; Robert J. Fox, Waukesha, Wis.; Ted W. Guelde, Deshler, Ohio; Eugene H. Harms, Perrysburg, Ohio, and Stephen N. McEwen, Bowling Green, Ohio, assignors to Henry Filters, Inc., Bowling Green, Ohio

Filed Sep. 27, 1982, Ser. No. 424,427
Int. Cl.³ B01D *21/12, 33/06*
U.S. Cl. 210—260 **22 Claims**



1. A combination settler filter for liquids comprising:

(A) a receiving tank,

(B) a removable cylindrical drum filter in said tank,

(C) guide means for guiding and supporting opposite ends of said drum filter in said tank,

(D) means for enabling removal of said drum filter by hand including:

(a) a ball and socket-type duct joint between one end of said drum filter and an outlet duct aperture in said tank, and

(b) resilient means acting on the other end of said drum filter to urge said joint together, and

(E) means for applying a reduced pressure to said aperture for removing clean liquid therefrom.

4,421,646

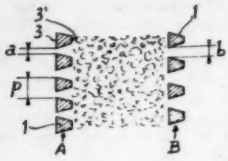
FILTERING DEVICE

Philippe Correge, Taverny, and Lucien Gay, Chavenay, both of France, assignors to Societe Nationale Elf Aquitaine (Production), Paris, France

Continuation of Ser. No. 709,409, Jul. 28, 1976, abandoned, Ser. No. 832,479, Sep. 12, 1977, abandoned, and Ser. No. 925,325, Jul. 17, 1978, abandoned. This application May 29, 1979, Ser. No. 43,225

Int. Cl.³ B01D *29/10*

U.S. Cl. 210—291 **4 Claims**



1. A filtering device comprising a plurality of filtering walls arranged successively between a chamber containing the effluent to be filtered and a chamber containing the filtered effluent, each filtering wall constituted by spaced juxtaposed strips having a trapezoidal section with a large base located in the inlet face of the filtering wall, said strips being separated from each other, at said inlet face, by slots of equal widths which constitute the inlet areas for the effluent to be filtered, the sum of said areas representing the total inlet area of the filtering wall, said total inlet area of the filtering wall being 1 to 50% smaller than the total inlet area of an adjacent filtering wall located downstream of the first-mentioned filtering wall with reference to the direction of flow of the effluent, and the width of the slots of a filtering wall being less than the width of the slots of an adjacent downstream filtering wall, the interval separating any two adjacent filtering walls being filled with a packing material permeable to fluids and inert with respect to the various constituents of the effluent, said packing material being constituted by a material resistant to erosion and compressive stresses, said material being hard glass balls the minimum diameter of which are larger than the width of the inlet slots of the filtering wall encountered by the effluent, each filtering wall being constituted by a strip having a trapezoidal section and wound up around a cylindrical surface so as to form a spiral having a constant pitch which is equal to the sum of the width of the large base of said trapezoidal section and a constant distance defining the width of said slots.

4,421,647

FILTER WITH INDEXABLE FILTER WEB

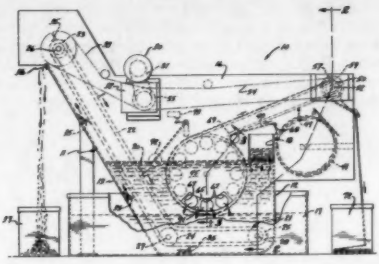
Mark R. Estabrook, and James L. Marchman, both of Rockford, Ill., assignors to Barnes Drill Co., Rockford, Ill.

Filed Jun. 28, 1982, Ser. No. 393,075

Int. Cl.³ B01D *33/32*

U.S. Cl. 210—387 **10 Claims**

1. A filter comprising a tank adapted to contain a pool of dirty liquid to be filtered, means for delivering dirty liquid to said pool, a supply roll of disposable filter web, a flexible and perforated endless conveyor for carrying the web along a curved path downwardly into and then upwardly out of the dirty pool, a pair of laterally spaced and stationary side members defining sides for a pool of clean liquid located within the dirty pool and above the bottom thereof, each of said side members having a laterally extending and stationary curved surface which conforms substantially to the curved path followed by said web as the latter moves through said dirty pool, the side margins of one side of said conveyor being located alongside said curved surfaces, said web being carried on the other side of said conveyor and defining a curved bottom for said clean pool whereby liquid in said dirty pool is filtered upon passing through said web and into said clean pool, the side edges of said conveyor coacting with said side members to define curved grooves between said conveyor and said side



members, the side margins of said web extending laterally beyond the side edges of said conveyor and spanning said grooves whereby the pressure of the liquid in the dirty pool forces the side margins of said web into said grooves to cause the web to seal the dirty pool from the clean pool adjacent said side members, and means for removing filtered liquid from said clean pool.

4,421,648

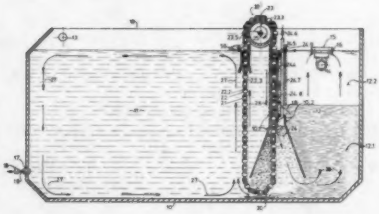
APPARATUS AND A METHOD FOR BIOLOGICAL TREATMENT OF WASTE WATERS

Ferdinand Besik, 3243 Chokecherry Crs., Mississauga, Ontario, Canada (L5L 1B1)

Filed Jun. 1, 1981, Ser. No. 268,725

Int. Cl.³ C02F *3/08*

U.S. Cl. 210—605 **13 Claims**



1. Apparatus for treatment of waste waters including means defining a reaction tank, waste water inlet means for introducing waste water into said reaction tank, endless vertical belt means for mixing, aerating and recirculating the liquid held in said reaction tank, said belt means comprising a pair of endless chain means arranged at opposite sides of said reaction tank, said chain means having a plurality of horizontal pipe means attached to and extending between said chain means, said pipe means being a chamber having openings located along their length thereof for flowing the reactor liquor out and for entering the air into said pipe means when said pipe means are located above the liquid level of the reactor mixed liquor and for release of the entrapped air from said pipe means through said openings in form of bubbles into said reactor mixed liquor when said pipe means are submerged in said reactor mixed liquor and are moving downwardly in said reaction tank, said belt means being positioned within said reaction tank with top portion of said belt means located above the top of said reaction tank and the bottom portion of said belt means extending

near the bottom of said reaction tank, said belt means being held in position by support means, said support means and said belt means being rotated by motor means, first solid wall partition means positioned inside said belt means, said first partition means being attached to two side walls of said reaction tank and forming with three side walls and the bottom of said reaction tank first reaction zone, second solid partition means positioned in parallel with said first partition means and alongside said belt means, said second partition means being attached to two side walls of said reaction tank and being submerged in the liquid held in said reaction tank and said second partition means extending diagonally into said reaction tank and forming an aeration zone between said first partition means and the two side walls of said reaction tank, and said second partition means forming with three side walls of said reaction tank second reaction zone, said first and second reaction zones being in communication with each other via openings formed by the bottoms of said first and second partition means, said two side walls and the bottom of said reaction tank, said reaction tank containing a fluidized bed of sludge solids located in said second reaction zone, said reaction tank also equipped with a vertical baffle means located in said second reaction zone and positioned in parallel with said second partition means, said vertical baffle means forming between said second partition means and said vertical baffle means a channel means for recirculating sludge from the top of said fluidized bed into said aeration zone and then back into said fluidized bed maintained in said second reaction zone, said vertical baffle means with three side walls of said reaction tank forming a clear well above and in communication with said fluidized bed in said second reaction zone and said vertical baffle means having openings for flowing the floating solids from said clear well back into said aeration zone, said vertical belt means being arranged to pump the sludge solids from the top of said fluidized bed into said aeration zone, to pump and disperse air into the reactor liquor in said aeration zone, to rotate the content in said first reaction zone and to circulate the reactor mixed liquor between said first reaction zone and said aeration zone, and said reaction tank equipped with the effluent discharge means and the excess sludge withdrawal means.

4. A method for treating waste waters comprising mixing the content of a single reaction tank by vertical belt means in three substantially different zones, the first reaction zone being substantially without dissolved oxygen, the second reaction zone being substantially saturated with dissolved oxygen and having a fluidized bed of sludge therein and the aeration zone for dispersing of the air into a downwardly recirculated mixed reactor liquor therein, said vertical belt means comprising a pair of endless chain means arranged at opposite sides of said reaction tank, said chain means having a plurality of horizontal pipe means attached to and extending between said chain means, said pipe means being a chamber having openings located along their length thereof for flowing the reactor liquor out and for entering the air into said pipe means when said pipe means are located above the liquid level of the reactor mixed liquor and for release of the entrapped air from said pipe means through said openings in form of bubbles into said reactor mixed liquor when said pipe means are submerged in said reactor mixed liquor and are moving downwardly in said reaction tank, said belt means being positioned within said reaction tank with top portion of said belt means located above the top of said reaction tank and the bottom portion of said belt means extending near the bottom of said reaction tank, said reaction tank comprising first solid wall partition positioned inside said belt means and attached to two side walls of said reaction tank to form said first reaction zone, second solid wall partition positioned in parallel with said first partition and alongside said belt means and attached to two side walls of said reaction tank and extending diagonally into said reaction tank to form between said first partition and said side walls of said reaction tank said aeration zone, and said second partition forming with side walls of said reaction tank said second reaction zone, said first and second reaction zones being in communication with each other via openings formed by the bottoms of said first and second partitions, said side walls and the bottom of said reaction tank, said reaction tank equipped in addition with a vertical baffle located in said second reaction zone and positioned in parallel with said second partition to form a channel for recirculating sludge from the top of said fluidized bed into said aeration zone and back into said fluidized bed and to form a clear well located above said fluidized bed in said second reaction zone and said reaction tank equipped with effluent discharge means and excess sludge discharge means,

feeding the waste water into said first reaction zone, continuously rotating by said vertical belt means the content therein and contacting the waste water with sludge solids in the absence of dissolved oxygen therein,

continuously circulating the reactor mixed liquor and sludge by said vertical belt means between said first reaction zone and said aeration zone, and mixing the reactor mixed liquor with sludge withdrawn from said fluidized bed in said aeration zone,

continuously recirculating the sludge from the top of said fluidized bed from said second reaction zone into said aeration zone, then downwardly to the bottom of said reaction tank then upwardly through said fluidized bed and contacting the waste water with the sludge solids in said aeration zone and then in said fluidized bed in the presence of dissolved oxygen,

continuously pumping air by said vertical belt means into said aeration zone and continuously dispersing the air into the downwardly recirculated mixed reactor liquor therein,

withdrawing the excess sludge from said reaction tank,

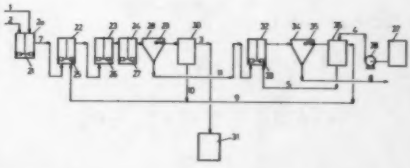
continuously flowing the purified waste water through the clear well located above said fluidized bed and out of said reaction tank and continuously flowing the floating solids from said clear well back into said aeration zone.

4,421,649

METHOD AND APPARATUS FOR ENRICHING COMPOUNDS OF LOW WATER SOLUBILITY FROM AQUEOUS SUSPENSIONS OF SUBSTANTIALLY INORGANIC SOLID SUBSTANCES

Karl J. Giskehaug; Kjell O. Löiten, and Glör T. Mejdell, all of Porsgrunn, Norway, assignors to Norsk Hydro a.s., Oslo, Norway

Filed Aug. 18, 1981, Ser. No. 293,983
Claims priority, application Norway, Aug. 20, 1980, 802471
Int. Cl.³ B01D *11/00*
U.S. Cl. 210—634 **10 Claims**



1. A process for enriching and extracting compounds of low water solubility from an aqueous suspension consisting essentially of substantially inorganic solid substances containing less than 10% by weight of said compounds of low water solubility, which comprises acidifying said aqueous suspension, contacting said acidified suspension with an organic solvent, extracting said acidified suspension with said organic solvent in at least two mixing stages with subsequent phase separation after each mixing stage, at least the first of said mixing stages comprising at least two mixing sequences arranged in series upstream of a phase separation where two liquid phases are separated from each other, a major proportion of said organic solvent resulting from said phase separation being recirculated

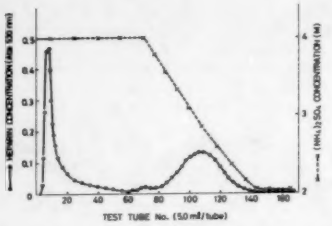
to the first mixing sequence in the corresponding upstream mixing stage.

4,421,650

PROCESS FOR SEPARATION OF CARBOHYDRATES

Kinzo Nagasawa, Tokyo, and Akira Ogamo, Yokohama, both of Japan, assignors to Seikagaku Kogyo Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 292,679, Aug. 13, 1981, abandoned.
This application Jan. 26, 1983, Ser. No. 461,059
Claims priority, application Japan, Aug. 22, 1980, 55-114688
Int. Cl.³ B01D *15/08*
U.S. Cl. 210—635 12 Claims



1. A process for separation of mucopolysaccharides which comprises separating a mucopolysaccharide into its constituent components comprising

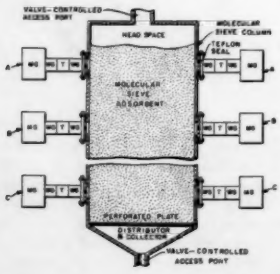
contacting said mucopolysaccharide with a chromatographic column comprising a support selected from the group consisting of crosslinked agarose, non-cross-linked agarose, and a polyvinyl alcohol, said support containing hydrophobic ligands selected from the group consisting of alkyl groups; alkyl groups substituted with at least one group selected from the group consisting of a hydroxyl group, a carboxyl group and an amino group; alkylene groups substituted with a hydroxyl group; aryl groups; and alalkyl groups, and thereby separating said mucopolysaccharide into its constituent components.

4,421,651

METHOD OF RECOVERING ADSORBED LIQUID COMPOUNDS FROM MOLECULAR SIEVE COLUMNS

Harvey R. Burkholder, and Glenn E. Fanslow, both of Ames, Iowa, assignors to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed May 28, 1982, Ser. No. 382,960
Int. Cl.³ B01J *20/34*
U.S. Cl. 210—672 12 Claims



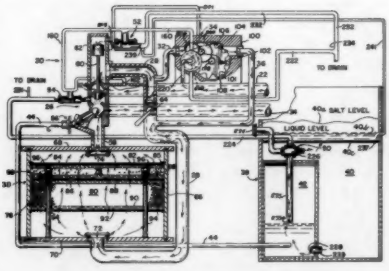
4. The method of recovering a volatile liquid compound molecularly adsorbed within porous granules of a molecular sieve adsorbent from a dilute liquid solution thereof, said granules having a relatively low dielectric loss compared to that of the adsorbed liquid and being arranged in a bed contained in a column providing head space above and collection space below the bed, upper access port means communicating with said head space, and lower access port means communicating with said collection space, said bed containing residual portions of said dilute liquid solution, comprising, with the upper port means closed and the lower port means open, directionally applying microwave energy to the bed upper portion and to successive portions thereof to selectively heat the adsorbed liquid compound within said granules for desorption thereof, the amount of applied microwave energy being sufficient to volatilize only part of the adsorbed compound within said granules to expell a liquid-gas effluent, said bed at the start of said microwave application being at a temperature at which the adsorbed compound is in a liquid state, the gas portion of the effluent creating a pressure in the bed upper portion pushing the effluent toward the bed lower portion, removing the liquid-gas effluent through a lower port, and separately collecting first and second portions of the removed liquid-gas effluent, said second portion having a substantially higher concentration of the desorbed compound than said first portion.

4,421,652

FLUID TREATING METHOD

Don E. Heskett, Villa Park, Ill., assignor to Fluid Power Research, Inc., Windsor, Wis.

Filed Dec. 15, 1980, Ser. No. 216,558
Int. Cl.³ B01D *15/04*
U.S. Cl. 210—687 6 Claims



1. A method of treating hard water containing impurities selected from the group consisting of chlorine impurities, soluble iron, insoluble iron, and bacteria, said method comprising simultaneously softening said water and removing said impurities from said water by passing said water containing one or more of said impurities through a bed of cation exchange resin particles having a particle size below 50 mesh measured on a dry basis, said bed of cation exchange resin material being characterized by the ion exchange resin particles being in surface to surface contact with each other and in substantially tightly packed relationship to each other.

4,421,653

PROCESS FOR THE DEPROTEINIZATION OF BIOLOGICAL FLUIDS

Michel Le Dain, Neuwiller, France, and Werner Ritschard, Kaiseraugst, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 231,400, Feb. 4, 1981, abandoned. This application Aug. 16, 1982, Ser. No. 408,311

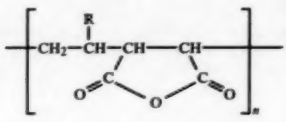
Claims priority, application Switzerland, Feb. 8, 1980, 1037/80

Int. Cl.³ B01D *15/00*

U.S. Cl. 210—692 8 Claims

1. A process for deproteinizing tumor extracts, comprising:

(a) adding to the tumor extracts a deproteinizing agent comprising a water-insoluble crosslinked polycarbonic acid obtained by crosslinking the polymer of the formula



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wherein R represents hydrogen or lower alkoxy and n represents a whole number of 100–10,000;

with a diamine and hydrolyzing unreacted anhydride groups and

(b) removing the resulting water-insoluble phase from the tumor extracts.

4,421,654

METAL EXTRACTION FROM SOLUTION AND NOVEL COMPOUNDS USED THEREFOR

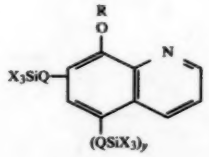
Edwin P. Plueddemann, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 279,388, Jul. 1, 1981, Pat. No. 4,379,931. This application Jul. 15, 1982, Ser. No. 398,492

Int. Cl.³ B01D *15/00, 15/04;* B01J *39/04, 45/00*

U.S. Cl. 210—698 21 Claims

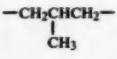
1. A method for preparing an immobilized chelating agent which comprises treating inorganic solid substrates with a silylating agent which is a compound of the formula



wherein

X is an alkoxy radical containing 1–4 carbon atoms;

Q is a $-CH_2)_3$ or



radical;

y has a value of 0 or 1;

R is hydrogen or an R'_3Si- radical wherein R' is CH_3— or CH_3CH_2—.

2. The product produced by the method of claim 1.

3. A method of removing heavy metal ions from solution which method comprises contacting a solution containing heavy metal ions with a silylated substrate of claim 2.

4,421,655

ORGANOPHILIC POLYPHENOLIC ACID ADDITIVES FOR WELL-WORKING COMPOSITIONS

Jack C. Cowan, Lafayette, La., assignor to Venture Chemicals, Inc., Lafayette, La.

Filed Jun. 11, 1981, Ser. No. 272,684

Int. Cl.³ C09K *7/06*

U.S. Cl. 252—8.5 M 14 Claims

1. An organophilic derivative of a polyphenolic compound comprising a complex salt of a polyphenolic acid, an amino compound, and a polyvalent metallic cation formed by reacting a salt of said polyphenolic acid and said amino compound with a polyvalent metal compound; wherein said polyphenolic acid is selected from the group consisting of humic acid, sulfonated humic acids, and mixtures thereof; wherein said amino compound has the structural formula:

$$R''—CO—NH—(C_xH_{2x}NR')_zH$$

where $2 \leqq x \leqq 3$; $z \geqq 2$; R' is selected from the group consisting of H and R"—CO, and mixtures thereof; R" is an aliphatic group containing from 11 to 29 carbon atoms; wherein at least two of the R' groups are H; wherein said polyvalent metallic cation is selected from the group consisting of calcium, magnesium, iron, zinc, nickel, chromium, aluminum, and mixtures thereof; wherein the amount of said amino compound is from about 20% to about 50% by weight based on the weight of moixture free polyphenolic acid; and wherein the amount of said polyvalent metallic cation compound is such that the percentage by weight, based on the weight of the moisture-free polyphenolic acid salt, is in the range from about (EW)÷18 to about (EW)÷4 where (EW) is the equivalent weight of the anhydrous polyvalent metallic cation compound.

4,421,656

SILICONE EMULSIFIER COMPOSITION, INVERT EMULSIONS THEREFROM AND METHOD THEREFOR

Philip A. Donatelli, and Joseph W. Keil, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Dec. 31, 1981, Ser. No. 336,153

Int. Cl.³ C09K *7/06;* E21B *43/00*

U.S. Cl. 252—8.5 P 23 Claims

1. An emulsifier composition consisting essentially of

(a) from 30 to 90 percent by weight of a polydiorganosiloxane having the formula

$$Z_3SiO\{(CH_3)_2SiO\}_x\{(CH_3)(R)SiO\}_y\{(CH_3)(Q)Si-O\}_zSiZ_3$$

wherein

Q denotes a polyoxyalkylene radical having the formula

$$—R'O(CH_2CH_2O)_p(CH_2CHCH_3O)_qR'',$$

R denotes a monovalent hydrocarbon radical having from 6 to 18 carbon atoms, inclusive,

R' denotes a divalent organic radical bonded to a silicon atom by a silicon-carbon bond,

R" denotes a monovalent radical selected from the group consisting of hydrogen, alkyl, cycloaliphatic, aryl, arylalkyl and acyl radicals,

Z denotes a monovalent hydrocarbon radical having from 1 to 5 carbon atoms, inclusive, or a Q radical, or an R radical,

x has an average value of from 0 to 400,

y has an average value of from 0 to 400,

z has an average value of from 0 to 5,

x+y+z has an average value of from 30 to 400,

p has an average value equal to or greater than the average value of q and

p+q has an average value sufficient to provide a formula weight of from 600 to 3500 for the $—(CH_2CH_2O)_p(CH_2CHCH_3O)_q—$ portion of the Q radical,

there being an average of at least one Q radical and an average of at least one R radical per molecule of the polydiorganosiloxane, and

(b) from 10 to 70 percent by weight of a solid, benzene-soluble organopolysiloxane resin copolymer consisting essentially of $(CH_3)_3SiO_{\frac{1}{2}}$ siloxane units and $SiO_{4/2}$ siloxane units, there being from 0.6 to 0.9, inclusive, of said $(CH_3)_3SiO_{\frac{1}{2}}$ siloxane units for every $SiO_{4/2}$ siloxane unit.

8. An emulsion composition comprising

(A) 40 to 75 parts by volume of a brine as a discontinuous phase,

(B) 25 to 60 parts by volume of a liquid hydrocarbon selected from the group consisting of paraffins having a flash point of at least 100° F., kerosene, diesel oil, crude oil, turbine fuel, mineral oil and gas oil as a continuous phase, (A) and (B) totaling 100 parts by volume and 100 parts by weight,

(C) 1.0 to 10 parts by weight, for every 100 parts by weight of brine plus liquid hydrocarbon, of an emulsifier composition consisting essentially of

(a) from 30 to 90 percent by weight of a polydiorganosiloxane having the formula

$$Z_3SiO\{(CH_3)_2SiO\}_x\{(CH_3)(R)SiO\}_y\{(CH_3)(Q)SiO\}_zSiZ_3$$

wherein

Q denotes a polyoxyalkylene radical having the formula

$$-R'O(CH_2CH_2O)_p(CH_2CHCH_3O)_qR'',$$

R denotes a monovalent hydrocarbon radical having from 6 to 18 carbon atoms, inclusive,

R′ denotes a divalent organic radical bonded to a silicon atom by a silicon-carbon bond,

R″ denotes a monovalent radical selected from the group consisting of hydrogen, alkyl, cycloaliphatic, aryl, arylalkyl and acyl radicals,

Z denotes a monovalent hydrocarbon radical having from 1 to 5 carbon atoms, inclusive, or a Q radical, or an R radical,

x has an average value of from 0 to 400,

y has an average value of from 0 to 400,

z has an average value of from 0 to 5,

x+y+z has an average value of from 30 to 400,

p has an average value equal to or greater than the average value of q and

p+q has an average value sufficient to provide a formula weight of from 600 to 3500 for the $-(CH_2CH_2O)_p(CH_2CHCH_3O)_q-$ portion of the Q radical,

there being an average of at least one Q radical and an average of at least one R radical per molecule of the polydiorganosiloxane, and

(b) from 10 to 70 percent by weight of a solid, benzene-soluble organopolysiloxane resin copolymer consisting essentially of $(CH_3)_3SiO_{\frac{1}{2}}$ siloxane units and $SiO_{4/2}$ siloxane units, there being from 0.6 to 0.9, inclusive, of said $(CH_3)_3SiO_{\frac{1}{2}}$ siloxane units for every $SiO_{4/2}$ siloxane unit.

4,421,657

HEAVY DUTY LAUNDRY SOFTENING DETERGENT COMPOSITION AND METHOD FOR MANUFACTURE THEREOF

Edwin Allen, Oupeye; Alan Dillarstone, Rocourt, and Joseph A. Reul, Heusy, all of Belgium, assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Apr. 8, 1982, Ser. No. 366,713

Int. Cl.³ C09K *3/18*; C11D *3/14, 11/00*; D06M *11/06*

U.S. Cl. 252—8.6 **13 Claims**

1. A heavy duty laundering and textile softening particulate detergent composition, useful for automatic machine washing of laundry in water and dispensable from a charging compartment of such a machine by action of water being fed through such compartment, which comprises a built synthetic organic detergent selected from the group consisting of anionic and nonionic detergents and mixtures thereof, a building proportion of a builder for the synthetic organic detergent selected from the group consisting of water soluble and water insoluble builders and mixtures thereof, and a softening proportion of bentonite, with the bentonite being in particles with which there is included a dispensing assisting proportion of a salt of a lower alkyl siliconic acid and/or polymerization product(s) thereof formed therefrom on storage.

12. A process for manufacturing a heavy duty laundry and textile softening particulate detergent composition, useful for automatic machine washing of laundry in water and dispensable from a charging compartment of such a machine by action of water being fed through such compartment, which includes a built synthetic organic detergent selected from the group consisting of anionic and nonionic detergents and mixtures thereof, a building proportion of a builder for the synthetic organic detergent selected from the group consisting of water soluble and water insoluble builders and mixtures thereof, and a softening proportion of bentonite, with the bentonite being in particles with which there is included a dispensing assisting proportion of a salt of a lower alkyl siliconic acid and/or polymerization product(s) thereof formed therefrom on storage, which comprises agglomerating particles of bentonite from finely divided form, passing through a No. 100 sieve and with over 50% thereof passing through a No. 200 sieve, into agglomerates of particle sizes within the range of No's. 10 to 100, U.S. Sieve Series, spray drying an aqueous crutcher mix of the synthetic organic detergent and the builder to detergent composition particles of sizes within the No. 10 to 100 range, blending the bentonite agglomerate particles and spray dried detergent composition particles and applying to the surfaces of such particles a dispensing assisting proportion of a salt of a lower alkyl siliconic acid.

4,421,658

HALOCARBON-SOLUBLE MOLYBDENUM COMPOSITION

Franklin G. Reick, Westwood, N.J., assignor to Michael Ebert, New York, N.Y.

Continuation-in-part of Ser. No. 218,008, Dec. 18, 1980, Pat. No. 4,349,444, which is a continuation-in-part of Ser. No. 158,329, Jun. 10, 1980, Pat. No. 4,284,518. This application Mar. 29, 1982, Ser. No. 362,849

Int. Cl.³ C10M *1/30*

U.S. Cl. 252—32.7 E **7 Claims**

1. A modified halocarbon oil composition capable of acting effectively as a hydraulic fluid and lubricant in those applications in which hydrocarbon oils create a fire hazard comprising a major amount of a chemically-inert halocarbon oil having lubricating characteristics inferior to hydrocarbon oils to which is added a minor amount of an oil soluble organic molybdenum compound in an amount lying within a relative volume range which results in a composition having exceptional low friction characteristics.

4,421,659

ZWITTERIONIC QUATERNARY AMMONIUM SULFATES AND LUBRICANTS CONTAINING SAME

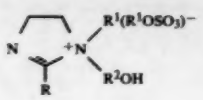
Andrew G. Horodysky, Cherry Hill, and Joan M. Kaminski, Mullica Hill, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jun. 30, 1982, Ser. No. 393,899

Int. Cl.³ C10M *1/40*

U.S. Cl. 252—33 **28 Claims**

1. A compound of the formula



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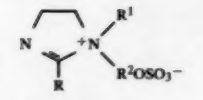
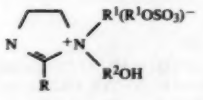
or



II

wherein R is a C_7 to C_{31} hydrocarbyl group, R^1 is an alkyl or alkylene group containing 1 or 2 carbon atoms and R^2 is a hydrocarbylene group containing 2 to 6 carbon atoms.

9. A lubricant or liquid fuel composition comprising a major proportion of a lubricant or fuel and a friction reducing amount of a compound of the formula:



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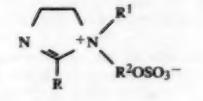


II

wherein R is a C_7 to C_{31} hydrocarbyl group, R^1 is an alkyl or alkylene group containing 1 to 2 carbon atoms and R^2 is a hydrocarbylene group containing 2 to 6 carbon atoms.

4,421,660

COLLOIDAL SIZE HYDROPHOBIC POLYMERS PARTICULATE HAVING DISCRETE PARTICLES OF AN INORGANIC MATERIAL DISPERSED THEREIN

Jitka Solc nee Hajna, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Dec. 15, 1980, Ser. No. 216,695
Int. Cl.³ C08K *3/10, 3/34;* **H01F** *1/28, 1/00*
U.S. Cl. 252—62.54 **21 Claims**

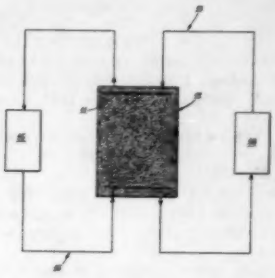
1. A method for preparing a colloidal size particulate comprising the steps of (1) emulsifying at least one hydrophobic, emulsion polymerizable monomer in an aqueous colloidal dispersion of discrete particles of an inorganic solid, said dispersion being maintained in a reasonably stable state with a chemical dispersant and/or surfactant, and (2) subjecting the resulting emulsion to emulsion polymerization conditions to form a stable, fluid aqueous colloidal dispersion of the particulate wherein essentially every particle of the inorganic solid is coated with the hydrophobic polymer resulting from said polymerization such that substantially all of the inorganic particles are maintained in a discrete spaced apart relationship to each other by the hydrophobic polymer; the dispersion further characterized in that when the inorganic solid is magnetic, the dispersion remains stable in any applied magnetic field.

4,421,661

HIGH-TEMPERATURE DIRECT-CONTACT THERMAL ENERGY STORAGE USING PHASE-CHANGE MEDIA

Terry D. Claar, Lisle, and Randy J. Petri, Chicago, both of Ill., assignors to Institute of Gas Technology, Chicago, Ill.

Filed Jun. 19, 1981, Ser. No. 275,380
Int. Cl.³ C09K *5/06;* **F24H** *7/04;* **F28F** *23/00*
U.S. Cl. 252—70 **13 Claims**



1. A high-temperature direct-contact thermal energy storage element for storage of thermal energy at about 400° to about 2000° F. comprising:

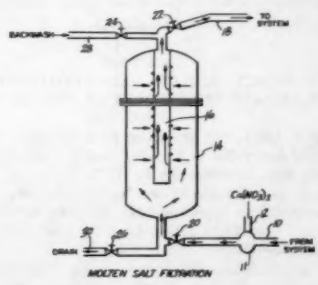
a containment vessel housing about 10 to about 90 volume percent solid-liquid phase-change chemical having a phase change temperature at about 400° to about 2000° F. and selected from the group consisting of alkali metal and alkaline earth carbonates, chlorides, nitrates, nitrites, fluorides, hydroxides, sulfates, and mixtures thereof supported within the pores of sensible thermal energy storage-support material through which heat storage and heat retrieval fluid may be circulated selected from the group consisting of metal oxides, aluminates, titanates and zirconates, having submicron particle size, the particles of which do not substantially coarsen with thermal cycling at temperatures up to about 2000° F., and having a surface area greater than about 10 square meters per gram of storage-support material, said storage-support material comprising about 10 to about 90 volume percent of said thermal storage element.

4,421,662

NONAQUEOUS PURIFICATION OF MIXED NITRATE HEAT TRANSFER MEDIA

Louis C. Fiorucci, Hamden, and Michael J. Morgan, Guilford, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Sep. 13, 1982, Ser. No. 414,725
Int. Cl.³ C09K *5/06;* **C01D** *9/16;* **C01F** *11/36*
U.S. Cl. 252—70 **18 Claims**



1. A method for removing carbonate and hydroxyl ion impu-

rities from a molten salt mixture of potassium nitrate and sodium nitrate which comprises:

dissolving a sufficient amount of an anhydrous nitrate salt of an alkali metal or alkaline earth metal in said molten salt capable of forming carbonate and hydroxide compounds which are essentially insoluble therein; and

separating said insoluble compounds from said molten salt whereby said impurities are removed.

4,421,663

ASPHALT-OIL HEAT TRANSFER COMPOSITION

Louie G. Embree, 3528 Bell Rd., Auburn, Calif. 95603, and Wayne W. Embree, Rte. 2, Box 1514, Lake Isabella, Calif. 93238

Filed May 18, 1981, Ser. No. 264,979
Int. Cl.³ C09K 5/00
U.S. Cl. 252—74 26 Claims

1. A heat transfer composition comprising a mixture of:

between about 2.5% and 40% by weight soft light commercial asphalt in the range of gradings between AR-1000 and AR-4000;

up to about 30% by weight of an asphalt-miscible oil; and

between about 50% and 90% by weight heat-conductive material of high specific gravity.

18. A heat transfer composition comprising a mixture of:

between about 2.5% and 40% by weight soft light commercial asphalt;

up to about 30% by weight of an asphalt-miscible oil;

between about 50% and 90% by weight heat-conductive material of high specific gravity; and

up to about 40% by weight rock salt.

4,421,664

COMPATIBLE ENZYME AND OXIDANT BLEACHES CONTAINING CLEANING COMPOSITION

Charles R. Anderson, Apple Valley, and Thomas R. Oakes, Stillwater, both of Minn., assignors to Economics Laboratory, Inc., St. Paul, Minn.

Filed Jun. 18, 1982, Ser. No. 389,617
Int. Cl.³ C11D 3/395, 7/42, 7/54
U.S. Cl. 252—94 18 Claims

1. A cleaning composition, having a combination of bleaching action and enzymatic degradation of biochemical soils, which comprises a slow release oxidant bleach composition which delays the appearance of the full concentration of the oxidant bleach, said composition having a tendency to release a small enzyme deactivating amount of the oxidant, prior to the full concentration of the bleach being released, a biological soil degrading enzyme and an amount of a chemical reducing agent effective to delay the appearance of an enzyme deactivating concentration of oxidant bleach composition until the full concentration of the oxidant bleach composition is released.

4,421,665

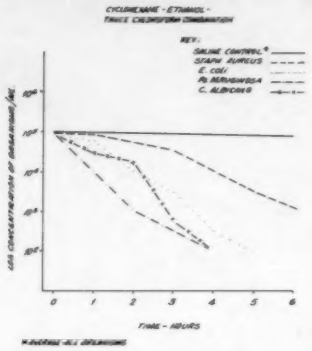
CONTACT LENS CLEANING COMPOSITION CONTAINING LIPID SOLVENT AND METHOD OF USING

Eugene A. Lloyd, 116 Broadway; Peter Madri, 33 S. Bay Ave., both of Amityville, N.Y. 11701, and William J. Closson, 179 Jayne Ave., Patchogue, N.Y. 11772

Continuation-in-part of Ser. No. 181,164, Aug. 25, 1980, abandoned. This application Jan. 19, 1981, Ser. No. 226,155
Int. Cl.³ C11D 3/43, 3/44, 3/48, 7/50
U.S. Cl. 252—106 43 Claims

1. A composition suitable for cleaning lenses and adapted to provide for enhanced solubility of lipids and lipoproteins which comprises in aqueous solution 0.001 to 1.0% by volume of a non-polar solvent which is cyclohexane or ethyl acetate.

23. A method for the cleaning of a contact lens comprising applying to the lens a composition which includes in aqueous



solution 0.001 to 1.0% by volume of a non-polar solvent which is cyclohexane or ethyl acetate.

4,421,666

POWDERY ANTIFOAMING COMPOSITIONS FOR AQUEOUS SYSTEMS, THEIR PREPARATION AND USE

Hans-Ulrich Hempel, Overath, and Edmund Schmadel, Leichlingen, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf-Holthausen, Fed. Rep. of Germany

Filed Mar. 12, 1982, Ser. No. 357,574
Claims priority, application Fed. Rep. of Germany, Apr. 18, 1981, 3115644
The portion of the term of this patent subsequent to Jul. 13, 1999, has been disclaimed.
Int. Cl.³ C11D 3/12
U.S. Cl. 252—140 16 Claims

1. A free-flowing, substantially silicone-free, powdery antifoaming composition for use in aqueous systems consisting essentially of:

(a) a liquid homogeneous mixture of a branched-chain primary C_{16}–C_{30} alcohol and hydrophobic-reacting colloidal silicic acid with a ratio by weight of alcohol:silicic acid of 100:2 to 100:20, as obtained by heating to 100° to 240° C. with agitation for a time sufficient to obtain a homogeneous mixture,

(b) a water-insoluble wax in a ratio by weight of (a):(b) of from 3:1 to 1:3, and

(c) a water-soluble powdered carrier where the components (a) and (b) are present on the carrier in homogeneous distribution, the powdered carrier being present in such an amount that a free-flowing product results.

4,421,667

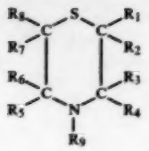
SULFUR BASED METAL CLEANERS

Merlin R. Lindstrom; Gary D. Macdonell, and Rector P. Louthan, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sep. 29, 1982, Ser. No. 427,222
Int. Cl.³ C11D 7/06, 7/32, 7/34
U.S. Cl. 252—156 8 Claims

1. An aqueous composition suitable as a metallic cleaning agent comprising a metal cleaning effective amount of at least one

(a) thiomorpholine compound represented by the formula:



where R_1, R_2, R_3, R_4, R_5, R_6, R_7, and R_8 can be hydrogen or any hydrocarbyl radical having from 1 to 3 carbon atoms ans where the total number of carbon atoms in R_1, R_2, R_3, R_4, R_5, R_6, R_7, and R_8 not to exceed about 10 carbon atoms; and where R_9 is hydrogen or any hydrocarbyl radical having from 1 to 8 carbon atoms;

(b) Group IA or IIA metal hydroxide; and

(c) water soluble surfactant.

4,421,668

BLEACH COMPOSITION

Roger B. Cox, Reading; David C. Steer, and John R. Woodward, both of Wirral, all of England, assignors to Lever Brothers Company, New York, N.Y.

Filed Jun. 16, 1982, Ser. No. 388,797

Claims priority, application United Kingdom, Jul. 7, 1981, 8120892

Int. Cl.[3] **C11D** *17/00;* **C01B** *13/00, 15/037;* **C12N** *9/02*

U.S. Cl. 252—174.12 **20 Claims**

1. An aqueous liquid bleach composition comprising a hydrogen peroxide precursor comprising

(a) from 50 to 1000 units per ml of the composition of a C_1 to C_4 alkanol oxidase enzyme, and

(b) from 5 to 25% by weight of the composition of a C_1 to C_4 alkanol substrate;

the enzyme and substrate being incapable of substantial interaction in the composition to form hydrogen peroxide until the composition is diluted with water; the composition containing less than 1 unit of catalase for every 2 units of alkanol oxidase; and the composition on dilution with 100 times its volume of water having a pH value of from 7.5 to 11.

19. An aqueous liquid detergent bleach composition which comprises

(i) from 1 to 90% by weight of detergent active compound;

(ii) a hydrogen peroxide precursor comprising

(a) from 50 to 1000 units of ethanol oxidase per ml of the composition; and

(b) from 5 to 25% by weight of ethanol;

the ethanol oxidase and ethanol being incapable of substantial interaction in the composition to form hydrogen peroxide until the composition is diluted with water, and

(iii) from 0.1 to 10% by weight of organic bleach activator;

the composition containing less than 1 unit of catalase for every 2 units of ethanol oxidase; and

the composition on dilution with 100 times its volume of water having a pH value of from 7.5 to 11.

4,421,669

PROCESS FOR THE STABILIZATION OF PARTICLES CONTAINING PEROXYGEN COMPOUNDS AND BLEACHING COMPOSITIONS CONTAINING PARTICLES STABILIZED ACCORDING TO THIS PROCESS

Jean Brichard, Vilvoorde, Belgium, assignor to Interox (Société Anonyme), Brussels, Belgium

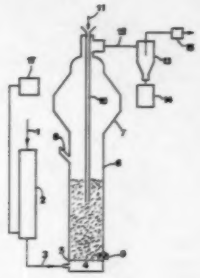
Filed Dec. 12, 1980, Ser. No. 216,073

Claims priority, application France, Dec. 12, 1979, 79 30664

Int. Cl.[3] **C01B** *15/10;* **C11D** *3/39, 7/18, 7/54*

U.S. Cl. 252—186.25 **6 Claims**

1. Process for the stabilisation of particles containing a peroxygen compound by coating using a coating agent that is insoluble in water and melts at low temperature according to which the particles containing the peroxygen compounds are kept in a fluidised bed, comprising introducing the coating agent into a continuously operating fluidised bed in the form of solid particles at a flow rate of from 0.01 to 50 g per minute and per liter of bed and maintaining the fluidised bed at a temperature between the temperature at which the coating agent begins to melt and this same temperature plus 20° C., with the solid particles of the coating agent having a diameter between



0.05 and 10 mm, the amount of coating agent being between 0.01 and 10% by weight of the peroxygen compound, the diameter of the particles containing the peroxygen compound being between 0.01 and 2 mm, the coating agent being a wax having an initial melting point of between 50° and 90° C., and selected from high molecular weight hydrocarbons, fatty acids and their derivatives, fatty alcohols and mixtures of these.

4,421,670

LIQUID CRYSTAL DIHYDROPHENANTHRENE SUBSTANCES

Hans-Joachim Deutscher, Halle; Sabine Richter, Haldesleben; Horst Zaschke, Halle; Dietrich Demus, Halle, and Ute Böettger, Halle, all of German Democratic Rep., assignors to VEB Werk für Fernsehelektronik Berlin im VEB Kombinat Mikroelektronik, Berlin-Oberschoneweide, German Democratic Rep.

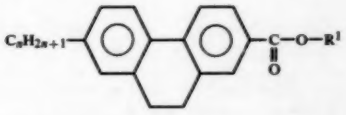
Filed Sep. 14, 1981, Ser. No. 302,287

Claims priority, application German Democratic Rep., Sep. 16, 1980, 223829; Sep. 16, 1980, 223841

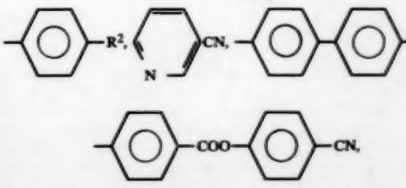
Int. Cl.[3] **C09K** *3/34;* **G02F** *1/13;* **C07C** *69/76, 121/64*

U.S. Cl. 252—299.62 **19 Claims**

1. 7-n-alkyl-8,10-dihydrophenanthrene-2-carboxylic acid esters of the general formula



wherein $R^1 = C_nH_{2n+1}$,



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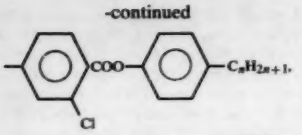
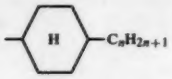




R^2=—C_nH_{2n+1}, —$C_nH_{2n+1}O$, —CN, —Cl, —Br, —CF_3, —CH_2—CH_2—CN, —CH=C(CN)$_2$

with n equal to 1 to 10.

4,421,671

RARE-EARTH-DOPED YTTRIA-GADOLINIA CERAMIC SCINTILLATORS

Dominic A. Cusano; Charles D. Greskovich, both of Schenectady, N.Y., and Frank A. DiBianca, Chapel Hill, N.C., assignors to General Electric Company, Schenectady, N.Y.

Filed Jun. 18, 1982, Ser. No. 389,815

Int. Cl.³ C09K *11/477*

U.S. Cl. 252—301.4 F **30 Claims**

1. A polycrystalline ceramic scintillator comprising a composition consisting essentially of between about 5 and 50 mole percent Gd_2O_3, between about 0.02 and 12 mole percent of at least one rare earth activator oxide selected from the group consisting of Eu_2O_3, Nd_2O_3, Yb_2O_3, Dy_2O_3, Tb_2O_3, and Pr_2O_3, at least one transparency promoter selected from the group consisting of ThO_2 in an amount up to 0.7 mole percent, ZrO_2, in an amount up to 0.7 mole percent and Ta_2O_5 in an amount up to 0.5 mole percent, said transparency promoter being present in amount sufficient to improve the transparency of the ceramic scintillator, and at least one light output restorer selected from the group consisting of CaO and SrO, in an amount sufficient to effect a higher light output than said ceramic scintillator absent said restorer the remainder being Y_2O_3.

22. A polycrystalline ceramic scintillator comprising a composition consisting essentially of between about 5 and 50 mole percent Gd_2O_3, between about 0.02 and 12 mole percent of at least one rare earth activator oxide selected from the group consisting of Eu_2O_3, Nd_2O_3, Yb_2O_3, Dy_2O_3, Tb_2O_3, and Pr_2O_3, and a transparency promoter selected from the group consisting of ThO_2 in an amount up to 0.35 mole percent, ZrO_2 in an amount up to 0.35 mole percent, and Ta_2O_5 in an amount up to 0.3 mole percent, said transparency promoter being present in an amount sufficient to improve the transparency of the ceramic scintillator, the remainder being Y_2O_3.

4,421,672

METHOD OF CYCLIC DESORPTION OF ADSORPTION MEDIA LOADED WITH ADSORBATES

Karl Rogge, Leihgestern, and Günther Gappa, Gelsenkirchen-Buer, both of Fed. Rep. of Germany, assignors to Bergwerksverband GmbH, Essen, Fed. Rep. of Germany

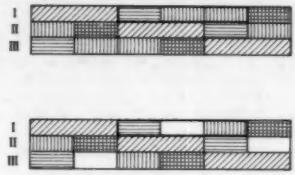
Filed Oct. 14, 1981, Ser. No. 311,301

Claims priority, application Fed. Rep. of Germany, Oct. 14, 1980, 3038715

Int. Cl.³ B01J *20/34;* **B01D** *53/04*

U.S. Cl. 502—55 **8 Claims**

1. A method of cyclic desorption of activated carbon cyclically loaded with adsorbates by a vapor, comprising the steps of performing a first desorption phase by guiding a mixture of a desorption vapor and an adsorption vapor over activated carbon; performing a second desorption phase by guiding a pure desorption vapor over said activated carbon; introducing the vapor mixture produced during the second desorption phase as said mixture into the first desorption phase; at least once interrupting the passage of the mixture of a desorption vapor over said activated carbon so that a substantially increased concentration of the adsorbate vapor in said desorption vapor and removal of the desorbed adsorbate out of the pores of the activated carbon is effected; and resuming the flow of said desorption vapor over said activated carbon to continue said desorption.



6. A method as defined in claim **1**, wherein said performing steps include utilizing a water vapor as the desorption vapor.

8. A method as defined in claim **1**; and further comprising the step of performing at least one further desorption phase between said first and second desorption phases.

4,421,673

CATALYST FOR MAKING POLYURETHANES

Francis W. Arbir, Itasca; Daniel S. Raden, Hawthorn Woods; Kenneth W. Narducy, Bloomingdale, and Francois M. Casati, Highland Park, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Apr. 9, 1981, Ser. No. 252,634

Int. Cl.³ B01J *31/04*

U.S. Cl. 502—167 **6 Claims**

1. A catalyst composition for preparing urethane foams using methylene chloride as auxillary blowing agent, consisting essentially of 3-dimethylaminopropylamine and 10–50 equivalent-% thereof of a branched octanoic acid.

4,421,674

SUPPORTED CATALYSTS FOR THE POLYMERIZATION OF ETHYLENE

Renzo Invernizzi, Milan; Ferdinando Ligorati, Usmate; Maurizio Fontanesi, Concorezzo, and Roberto Catenacci, Milan, all of Italy, assignors to Euteco Impianti S.p.A., Milan, Italy

Filed May 10, 1982, Ser. No. 376,727

Claims priority, application Italy, May 21, 1981, 21881 A/81

Int. Cl.³ C08F *4/02, 4/64*

U.S. Cl. 502—154 **7 Claims**

1. Process for the preparation of a catalyst which is active in the polymerization of gaseous ethylene at low pressure characterized by the steps of:

(a) providing a solution consisting of $MgCl_2$ dissolved in ethanol at a concentration of 100 to 300 g of $MgCl_2$ per liter of solution, having a water content not exceeding 5% by weight;

(b) spray drying said solution by spraying the latter into a flow of substantially anhydrous gaseous nitrogen having a purity of at least 99.9% and having an inlet temperature below 280° C. while controlling the flows of said nitrogen and of said solution so that the outlet temperatures of the gaseous mixture is by at least 40° C. lower than the inlet temperature and that the ethanol is not completely evaporated, to obtain $MgCl_2$ particles of spherical form and of a size in the range of from 3 to 100 microns with a residual alcoholic hydroxyl content of from 1.5% to 20% by wt., the solid $MgCl_2$ in said particles having an X-ray spectrum in which the maximum peak at 2.56 angstrom characteristic of crystalline $MgCl_2$ is practically absent and a new maximum peak at about 10.8 angstrom is present;

(c) reacting said $MgCl_2$ particles with a titanium halide, said halide being in the vapour or liquid form, optionally di-

luted with an inert, vaporizable solvent, at a temperature of from 20° C. to 100° C., the reaction time being in the range of from 2 to 60 minutes, while maintaining the weight ratio between the titanium halide and the $MgCl_2$ particles in the reaction zone in the range of from 0.001:1 to 2:1;

(d) recovering by physical means the reaction product particles when the latter contains from 0.7% to 12% by wt. (expressed as titanium) and on dry basis of titanium chemically linked to the solid;

(e) mixing the said reaction product particles with an organometallic compound selected from the group consisting of alkylaluminium or halides of alkylaluminium, in the same solvent used for the polymerization of ethylene, at room temperature and controlling the respective amounts so as to have in the mixture an atomic ratio between Al and Ti of from 100:1 to 5,000:1.

4,421,675

PROCESS

Robert A. Sawicki, Wappingers Falls, N.Y., assignor to Texaco Inc., White Plains, N.Y.

Filed Jan. 8, 1982, Ser. No. 337,915

Int. Cl.³ B01J *31/02*

U.S. Cl. 502—150 **23 Claims**

1. The process for preparing a functionalized refractory oxide which comprises

(i) reacting a porous refractory oxide bearing surface hydroxyl groups with a polyoxyalkylene glycol or monoalkyl ether

$$HO\text{+}CH_2CH(X)O\text{+}_nR^*$$

wherein R* is hydrogen or lower alkyl hydrocarbon group containing 1–8 carbon atoms, X is hydrogen or methyl, and n is 1–300 thereby forming a functionalized oxide bearing at least one

$$-O(CH_2CH(X)O)_nR^*$$

residue on the surface of said oxide; and

(ii) recovering said functionalized oxide bearing at least one

$$-O(CH_2CH(X)O)_nR^*$$

residue on the surface thereof.

4,421,676

PROCESS FOR PREPARATION OF PALLADIUM ON CARBON CATALYSTS USED IN THE PURIFICATION OF CRUDE TEREPHTHALIC ACID

Imre Puskas, Glen Ellyn, and David E. James, Batavia, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Oct. 29, 1981, Ser. No. 316,337

Int. Cl.³ B01J *23/44*; **C07C** *51/42*

U.S. Cl. 502—185 **5 Claims**

1. A method of making a catalyst used for purification of terephthalic acid containing up to 10,000 ppm of 4-carboxybenzaldehyde in a standard laboratory test wherein 4-carboxybenzaldehyde content is decreased to less than 100 parts per million which comprises adsorbing catalytically active palladium crystallites on the surface of a porous carbonaceous support material comprising activated carbon granules having a surface area of at least 600 m^2/g wherein said palladium crystallites are predominantly less than 35 Å in longitudinal measurement, which method comprises contacting said support with an aqueous solution of a nitritopalladate salt comprising $Na_2Pd(NO_2)_4$, prepared by reacting a nitrite salt and a palladium halide in a mole ratio of about 4:1, and wherein said nitritopalladate salt is adsorbed upon the surface of said support material and reduction to metallic palladium occurs.

2. The method of claim 1 wherein said nitritopalladate salt is prepared by reacting stoichiometric quantities of a nitrite salt with a palladium halide selected from the group consisting of palladium chloride, palladium bromide and palladium iodide.

3. The method of claim 2 wherein said nitrite salt is sodium nitrite.

4,421,677

TRANSPARENT MATERIAL HAVING ELECTRICAL CONDUCTIVITY WHICH IS DEPENDENT ON THE DOSE OF OPTICAL RADIATION RECEIVED

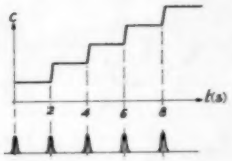
Christian Bianchin, Saint Martin d'Heres; Alain F. Deneuville, Vif, and Philippe Gerard, Meylan, all of France, assignors to Commissariat a l'Energie Atomique, Paris and Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, both of, France

Filed Jun. 28, 1978, Ser. No. 919,976

Claims priority, application France, Jun. 29, 1977, 77 19922

Int. Cl.³ H01C *13/00*

U.S. Cl. 252—501.1 **1 Claim**



1. A transparent material whose electrical conductivity is dependent on the dose of optical radiation which it has received, said material comprising a thin layer of substoichiometric amorphous oxide of a metal selected from the group consisting of WO_x and MoO_x, wherein WO_x is in the range of $2.2<x<2.6$ and MoO_x is in the range of $2.4<x<2.7$.

4,421,678

ELECTRICALLY CONDUCTIVE COMPOSITIONS COMPRISING AN ETHYLENE POLYMER, A MINERAL FILLER AND AN OILED, ELECTRICALLY CONDUCTIVE CARBON BLACK

Aspy K. Mehta, Baton Rouge, La., assignor to Union Carbide Corporation, Danbury, Conn.

Filed Dec. 29, 1980, Ser. No. 221,153

Int. Cl.³ H01B *1/06*

U.S. Cl. 252—511 **12 Claims**

1. An electrically conductive composition comprising an ethylene polymer, a mineral filler and conductive carbon black having a surface area greater than about 500 m^2/gram and oiled with a paraffin mineral oil of lubricating viscosity wherein the mineral filler is present in an amount of about 5 to about 30 percent by weight and the oiled carbon black is present in an amount of about 5 to about 25 percent by weight.

4,421,679

METHYL SUBSTITUTED-2-OXOHEXANE DERIVATIVES AND PROCESSES FOR PREPARING AND USING SAME

Richard M. Boden, Monmouth Beach; Lambert Dekker, Wyckoff; Frederick L. Schmitt, Holmdel, all of N.J., and Augustinus G. Van Loveren, Rye, N.Y., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 195,630, Oct. 9, 1980, Pat. No. 4,335,009, which is a continuation-in-part of Ser. No. 160,788, Jun. 19, 1980, Pat. No. 4,287,084. This application Feb. 4, 1982, Ser. No. 345,665

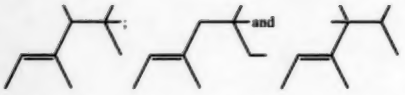
The portion of the term of this patent subsequent to Dec. 8, 1998, has been disclaimed.

Int. Cl.[3] A61K *7/46*

U.S. Cl. 252—522 R 6 Claims

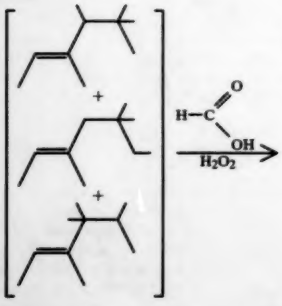
1. A process for augmenting or enhancing the aroma of a consumable material selected from the group consisting of perfume compositions, colognes and perfumed articles comprising the step of intimately admixing with a perfume composition, a cologne or a perfumed article base, an aroma augmenting or enhancing quantity of a product produced according to a process comprising the steps of:

(i) dimerizing isoamylene to form diisoamylene in the presence of an acid catalyst, said diisoamylene being a mixture of compounds having the structures:



said diisoamylene having a distillation range of 36°–40° C. vapor temperature; 74°–94° C. liquid temperature and 4–5 mm/Hg pressure;

(ii) admixing the resulting diisoamylene mixture with a mixture of concentrated hydrogen peroxide and formic acid in order to effect the reaction:



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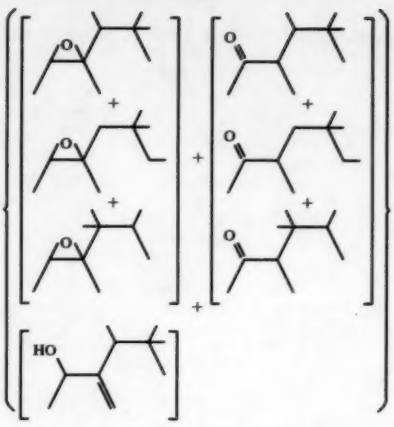
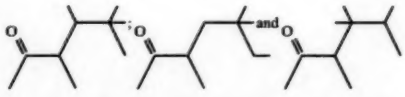


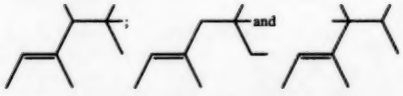
at a temperature in the range of from about 40° C. up to about 70° C.;

(iii) distilling the resulting reaction product at a vapor temperature in the range of from about 93° C. up to about 100° C. vapor temperature; 109° C. up to 120° C. liquid temperature at 50 mm/Hg pressure whereby a mixture of ketones is formed having the structures:



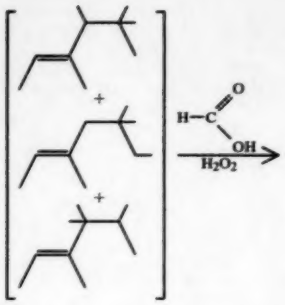
2. A process for augmenting or enhancing the aroma of a consumable material selected from the group consisting of perfume compositions, colognes and perfumed articles comprising the step of intimately admixing with a perfume composition, a cologne or a perfumed article base, an aroma augmenting or enhancing quantity of a product produced according to a process comprising the steps of:

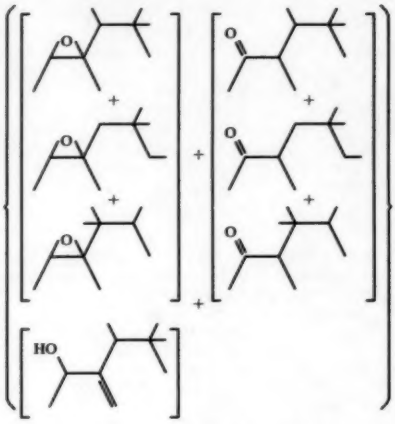
(i) dimerizing isoamylene to form diisoamylene in the presence of an acid catalyst, said diisoamylene being a mixture of compounds having the structures:



said diisoamylene having a distillation range of 36°–40° C. vapor temperature; 74°–94° C. liquid temperature and 4–5 mm/Hg pressure;

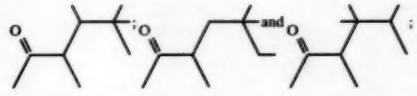
(ii) admixing the resulting diisoamylene mixture with a mixture of concentrated hydrogen peroxide and formic acid in order to effect the reaction:



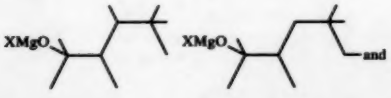


at a temperature in the range of from about 40° C. up to about 70° C.;

(iii) distilling the resulting reaction product at a vapor temperature in the range of from about 93° C. up to about 100° C. vapor temperature; 109° C. up to 120° C. liquid temperature at 50 mm/Hg pressure whereby a mixture of ketones is formed having the structures:



(iv) reacting the resulting mixture of ketones with a methyl magnesium halide in the presence of an inert solvent whereby a mixture of organometallic compounds is formed having the structures:



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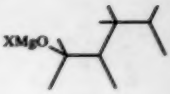
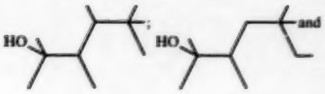
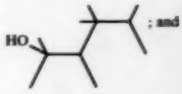


wherein X is chloro or bromo;

(v) reacting the resulting organometallic compound mixture with acid thereby forming a mixture of alcohols having the structures:





(vi) fractionally distilling the resulting acid; and mixture at a temperature in the range of 70°–74° C. vapor temperature; 95°–113° C. liquid temperature and 10 mm/Hg pressure.

4,421,680

CLEANING AND DEGREASING COMPOSITION

Irving Shivar, Rte. 2, Box 231, Camden, S.C. 29020

Filed Sep. 18, 1981, Ser. No. 303,467

Int. Cl.³ C11D *1/84, 3/08*

U.S. Cl. 252—526 **1 Claim**

1. A degreasing composition consisting essentially of 4.0–4.25% by weight of n-butoxyethanol, 4.0–4.25% by weight of a coconut diethanolamide, 0.75–1.0% by weight of sodium metasilicate pentahydrate, 0.2–0.3% by weight of potassium hydroxide, 1.75–2.0% by weight of cocamidopropyl betaine, 4.0–4.25% by weight of an isopropylamine salt of dodecylbenzenesulfonic acid and water.

4,421,681

LIQUID DETERGENT COMPOSITION COMPRISING AMMONIUM ALKYL SULFATE, POLYOXYALKYLENE ALKYL ETHER AND FATTY ACID DIALKANOLAMIDE

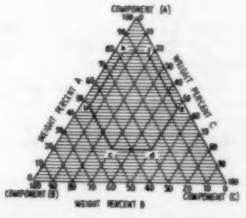
Hajime Hirota, Tokyo, and Hiroshi Watanabe, Funabashi, both of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Feb. 8, 1982, Ser. No. 346,713

Claims priority, application Japan, Feb. 23, 1981, 56-25258

Int. Cl.³ C11D *1//14*

U.S. Cl. 252—541 **4 Claims**



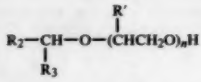
1. A liquid detergent composition having good stability at low and high temperatures and high foaming power, consisting essentially of:

(A) 5–25 wt. % of an ammonium alkyl sulfate of the formula:

$R_1OSO_3NH_4$ (1)

wherein R_1 is straight-chain or branched-chain, saturated hydrocarbon group having 8–18 carbon atoms on the average;

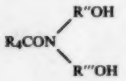
(B) 0.2–10 wt. % of a polyoxyalkylene alkyl ether of the formula:



(2)

wherein R_2 is alkyl having 6–14 carbon atoms, R_3 is alkyl having 1–7 carbon atoms, R' is hydrogen or methyl, and n is an integer in the range of 3–15;

(C) 0.2–10 wt. % of a fatty acid dialkanolamide of the formula:



(3)

wherein R_4 is a straight-chain or branched-chain, saturated or unsaturated hydrocarbon group having 7–17 carbon atoms, R'' and R''' each is C_mH_{2m}, and m is 2 or 3, with the proviso that the relative proportions of components A, B and C lie on or within the polygon defined by the straight lines connecting points a, b, c, d, e and f in the attached drawing; and

the balance is essentially water.

4,421,682
HEATING OF PROTEINACEOUS LIQUIDS

Richard H. Edwards, and George O. Kohler, both of Albany, Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Apr. 6, 1981, Ser. No. 251,667
Int. Cl.³ C07G 7/00; A23J 1/14
U.S. Cl. 260—112 R 12 Claims

1. A method of raising the temperature of a first liquid containing uncoagulated heat coagulable proteins above the coagulation temperature of said proteins to coagulate said proteins, by means of a heat exchanger without contact between said first liquid and said heat exchanging surface, which comprises:

mixing said first liquid with an amount of a second liquid which has been previously heated in a heat exchanger, the temperature of said second liquid being sufficient to raise the temperature of said first liquid above the coagulation temperature of said heat coagulable proteins therein; and

holding said mixed liquids together for a time sufficient to coagulate said proteins in said first liquid.

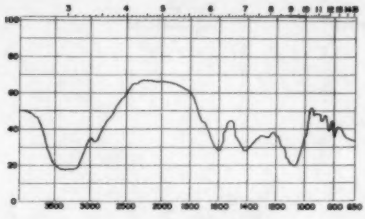
4,421,683
SUBSTANCE EFFECTIVE FOR PREVENTION OR THERAPY OF NEPHRITIS AND METHOD FOR PREPARATION THEREOF

Akira Fujimaki, Koganei, Japan, assignor to Zaidan Hojin Minsei Kagaku Kyokai, Tokyo, Japan

Filed Dec. 8, 1981, Ser. No. 328,534
Claims priority, application Japan, Dec. 15, 1980, 55-176966; Dec. 15, 1980, 55-176967
Int. Cl.³ C07G 7/00
U.S. Cl. 260—112 R 9 Claims

1. A method of preparing a substance effective for prevention or therapy of nephritis, which comprises preparing a concentrated extract from watermelon pulp juice, adding to the extract a lower alcohol to provide an alcoholic solution with an alcohol concentration of about 80 to 95% by weight, adding acetone to the resulting solution in a volume of 1.5 to 2.5 times the volume of said solution to obtain a precipitates of glucopeptide, further repeating at least once the purification procedure for the precipitate which comprises dissolution with a similar alcohol and precipitation from the resulting soluton with acetone, and finally removing the remaining solvent to dryness to obtain a white powder of glucopeptide.

9. A glucopeptide effective for nephritis, having unidentified sugar and peptide, exhibiting two different kinds of migration



fractions in each of fractionations by high-pressure paper electrophoresis and thin-layer chromatography, indicating maximum absorption at 325 mμ by micro biurette analysis, showing a specific infrared absorption spectrum as shown in FIG. 5, having a specific rotation $[\alpha]_D^{25.5} = +374.91$ (water), and being in chemical reactions positive in each of Ninhydrin reaction, Glycyrrhizin reaction, and reducing sugar reaction and negative in TCA (25%) reaction.

4,421,684
COLUMN FOR ADSORPTION OF BLOOD PROTEINS

Toshihide Nakashima; Maso Tanihara, both of Kurashiki, and Koichi Takakura, Okayama, all of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Division of Ser. No. 250,630, Apr. 3, 1981, Pat. No. 4,384,954.
This application May 28, 1982, Ser. No. 383,137
Claims priority, application Japan, Apr. 16, 1980, 55-50733; Apr. 16, 1980, 55-50734; Sep. 22, 1980, 55-131804; Sep. 22, 1980, 55-131805; Oct. 29, 1980, 55-152457
Int. Cl.³ A61K 37/02; C07G 7/00
U.S. Cl. 260—112 B 12 Claims

1. A method of removing blood proteins by adsorption which comprises bringing blood, plasma or serum into contact with porous glass having a mean pore diameter in the range of 30–3,000 angstroms with the ratio of the volume occupied by pores with diameters within the range of 0.8D–1.2D to the whole pore volume being at least 80%, D being the mean pore diameter, and with the mean pore diameter of the porous glass being selected to correspond to the molecular weights of the proteins to be adsorbed as follows:

(a) for adsorption of proteins having molecular weights of 500–20,000, porous glass with a mean pore diameter in the range of 30–150 angstroms is used;

(b) for adsorption of proteins having molecular weights of

20,000–200,000, porous glass with a mean pore diameter in the range of 150–1,000 angstroms is used; and

(c) for adsorption of proteins having molecular weights of 200,000–1,000,000, porous glass with a mean pore diameter in the range of 1,000–3,000 angstroms is used.

4,421,685

PROCESS FOR PRODUCING AN INSULIN

Ronald E. Chance, Westfield, and James A. Hoffmann, Indianapolis, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 134,390, Mar. 27, 1980, abandoned. This application May 11, 1981, Ser. No. 262,141

Int. Cl.³ C07C *103/52*; C07G *7/00*

U.S. Cl. 260—112.7 **18 Claims**

1. A process for combining an A-chain of an insulin or an insulin analog and B-chain of an insulin or an insulin analog to produce an insulin or an insulin analog, which comprises bringing the S-sulfonated form of the A-chain, the S-sulfonated form of the B-chain, and a thiol reducing agent together in an aqueous medium under conditions which produce a mixture having (1) a pH of from about 8 to about 12, (2) a total protein concentration of from about 0.1 to about 50 milligrams per milliliter, and (3) an amount of thiol reducing agent which affords a total of from about 0.4 to about 2.5 —SH groups per each $-SSO_3^-$ group present in the total amount of A- and B-chain S-sulfonates, and allowing formation of insulin or an insulin analog to occur by maintaining the mixture at a temperature of from about 0° C. to about 25° C. and in an environment which provides a source of oxygen.

4,421,686

4-NORBORNYL-SULFONYL AZETIDINONE INTERMEDIATES AND PROCESS FOR PREPARING (S)-3-ACYLAMINO-4-SUBSTITUTED-2-AZETIDINONES

Richard H. Mueller, Lawrenceville; Christopher M. Cimarusti, Pennington, and Thomas P. Kissick, Princeton, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 325,781, Nov. 30, 1981. This application Sep. 13, 1982, Ser. No. 416,837

Int. Cl.³ C07D *205/08*

U.S. Cl. 260—239 A **2 Claims**

1. (3R-cis)-3-Phenylacetylamino-4-norbornylsulfonyl-2-azetidinone.

2. (3R-cis)-3-Phenoxyacetylamino-4-norbornylsulfonyl-2-azetidinone.

4,421,687

MACBECIN DERIVATIVES

Toru Hasegawa, Kawanishi; Masayuki Muroi, Suita, and Seiichi Tanida, Nagaokakyo, all of Japan, assignors to Takeda Chemical Industries, Limited, Osaka, Japan

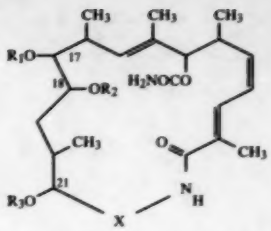
Filed Sep. 2, 1982, Ser. No. 414,031

Claims priority, application Japan, Sep. 26, 1981, 56-152644; Jun. 4, 1982, 57-96711

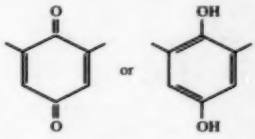
Int. Cl.³ C07D *225/06*

U.S. Cl. 260—239.3 B **5 Claims**

1. Antibiotic C-33196 E-6, C-33196 E-6-R, C-33196 E-7 or C-33196 E-7-R, which has the following chemical structure:



wherein one of the groups of R_1, R_2 and R_3 is methyl and the remaining ones are hydrogen, and X is a group of



and has the following properties:

(a) Antibiotic C-33196 E-6:

(I) Specific rotation: $[\alpha]_D^{24}+258.8°\pm20°$ (c=0.5, $CHCl_3$);

(II) Ultraviolet absorption spectrum: λ_{max}^{MeOH} 273 nm±2 nm ($E_{1\,cm}^{1\%}$ 454±45); λ_{max}^{MeOH} 397 nm±2 nm ($E_{1\,cm}^{1\%}$ 50.3±5);

(III) Infrared absorption spectrum, principal peaks (cm^{-1}): 1720, 1705, 1670, 1650, 1610, 1505, 1380, 1325, 1265, 1210, 1090, 1040;

(b) Antibiotic C-33196 E-6-R:

(I) Specific rotation: $[\alpha]_D^{24}+37.8°\pm4°$ (c=0.5, MeOH);

(II) Ultraviolet absorption spectrum: λ_{max}^{MeOH} 255 nm±2 nm ($E_{1\,cm}^{1\%}$ 337±30); λ_{max}^{MeOH} 307 nm±2 nm ($E_{1\,cm}^{1\%}$ 91±9);

(III) Infrared absorption spectrum, principal peaks (cm^{-1}): 1720, 1650, 1600, 1535, 1460, 1380, 1320, 1090, 1040, 1010;

(c) Antibiotic C-33196 E-7:

(I) Specific rotation: $[\alpha]_D^{24}+37.4°\pm4°$ (c=0.5, $CHCl_3$);

(II) Ultraviolet absorption spectrum: λ_{max}^{MeOH} 274 nm±2 nm ($E_{1\,cm}^{1\%}$ 502±50); λ_{max}^{MeOH} 396 nm±2 nm ($E_{1\,cm}^{1\%}$ 59.8±6);

(III) Infrared absorption spectrum, principal peaks (cm^{-1}): 1725, 1670, 1650, 1605, 1500, 1380, 1325, 1260, 1205, 1150, 1095, 1035;

(d) Antibiotic C-33196 E-7-R:

(I) Specific rotation: $[\alpha]_D^{24}+18.6°\pm2°$ (c=0.5, MeOH);

(II) Ultraviolet absorption spectrum: λ_{max}^{MeOH} 250 nm±2 nm ($E_{1\,cm}^{1\%}$ 305±30); λ_{max}^{MeOH} 315 nm±2 nm ($E_{1\,cm}^{1\%}$ 68±7);

(III) Infrared absorption spectrum, principal peaks (cm^{-1}): 1710, 1640, 1600, 1485, 1455, 1380, 1310, 1250, 1090, 1040.

4,421,688

MACBECIN DERIVATIVES

Masayuki Muroi, Suita, and Makoto Kida, Kawanishi, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

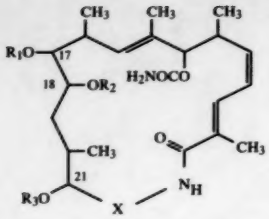
Filed Sep. 2, 1982, Ser. No. 414,032

Claims priority, application Japan, Sep. 17, 1981, 56-147175

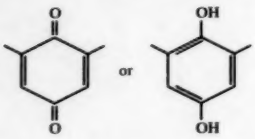
Int. Cl.³ C07D *225/06*

U.S. Cl. 260—239.3 B **7 Claims**

1. A compound represented by the formula:



wherein one of the groups of R_1, R_2 and R_3 is hydrogen, and the remaining ones are methyl, and X is a group of



4,421,689

DERIVATIVES OF 1,5-DIMETHYLBICYCLO [3,2,1] OCTANE, THE PREPARATION OF THESE COMPOUNDS AND THEIR USE AS PERFUME COMPOUND

Albertus J. Mulder, Badhuisweg 3, Amsterdam, Netherlands

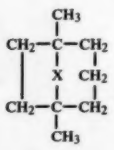
Filed Nov. 5, 1979, Ser. No. 91,098

Claims priority, application Netherlands, Nov. 15, 1978, 7811285

Int. Cl.[3] **C07D** *319/04, 317/10;* **C07C** *45/00*

U.S. Cl. 549—360 **6 Claims**

1. A compound of the general formula



comprising a derivative of 1,5 dimethylbicyclo [3,2,1] octane wherein X is an organic group selected from the group consisting of a

group in which R_1 and R_2 are alkyl groups or a

group, in which, R_3 is an ethylene or trimethylene group which may be substituted with one or more alkyl groups.

4,421,690

PROCESS FOR THE PREPARATION OF 24,24-DIFLUORO-1α,25-DIHYDROXY VITAMIN D_3 AND INTERMEDIATES OBTAINED THEREFROM

John J. Partridge, Upper Montclair; Shian-Jan Shiuey, Nutley, and Milan R. Uskokovic, Upper Montclair, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

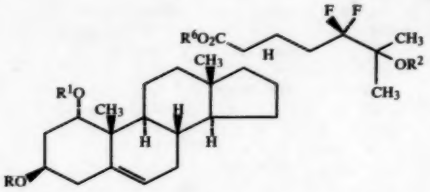
Filed May 17, 1982, Ser. No. 379,387

Int. Cl.[3] **C07J** *9/00*

U.S. Cl. 260—397.1 **47 Claims**

5. A process for the synthesis of a compound of the formula

VIII



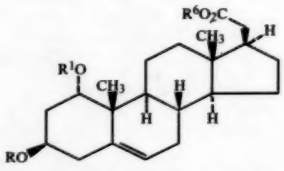
wherein F is fluorine, R and R^1 are lower alkyl, aralkyl, aryl, tri-lower alkylsilyl, di-lower alkylarylsilyl, lower-alkyldiarylsilyl, triarylsilyl or a group of the formula

III

wherein R^3 is hydrogen or lower alkyl; R^4 and R^5 each independently is lower alkyl and R^4 and R^5 taken together are lower alkylene of from 3 to 6 carbon atoms which process comprises the steps of;

(a) reacting a compound of the formula

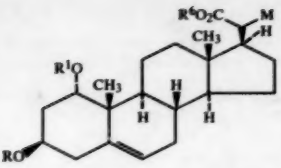
V



wherein R and R^1 are lower alkyl, aralkyl, aryl, tri-lower alkylsilyl, di-lower alkylarylsilyl, lower-alkyldiarylsilyl, triarylsilyl or a group of the formula

III

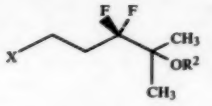
wherein R^3 is hydrogen or lower alkyl; R^4 and R^5 each independently is lower alkyl and R^4 and R^5 taken together are lower alkylene of from 3 to 6 carbon atoms and R^6 is lower alkyl, aralkyl or aryl with an organometallic reagent in an aprotic solvent at temperatures in the range of from about −78° C. to about 0° C. so as to yield a compound of the formula



VI

wherein R, R^1 and R^6 are as above and M is lithium, sodium, potassium, magnesium/2 or zinc/2

(b) reacting the reaction product of step (a) with a compound of the formula

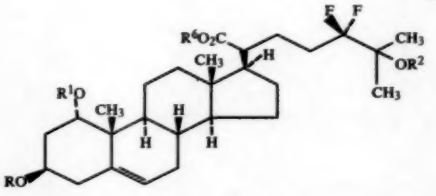


VII

wherein X is iodo, bromo, chloro, lower alkylsulfonyloxy, phenylsulfonyloxy, or substituted phenylsulfonyloxy; F is fluorine and R^2 is lower alkyl, aralkyl, aryl, tri-lower alkylsilyl, di-lower alkylarylsilyl, lower-alkyldiarylsilyl, triarylsilyl or a group of the formula

III

wherein R^3 is hydrogen or lower alkyl; R^4 and R^5 each independently is lower alkyl and R^4 and R^5 taken together are lower alkylene of from 3 to 6 carbon atoms in an aprotic solvent at temperatures in the range of from about −78° C. to about 60° C. so as to yield the compound of the formula



VIII

wherein F, R, R^1 and R^4 are as above.

4,421,691

PREPARATION OF FATTY ACID ESTERS

Wolfgang H. E. Müller, and Peter Hofmann, both of Marl, Fed. Rep. of Germany, assignors to Chemische Werke Hüls AG, Marl, Fed. Rep. of Germany

Filed Jun. 5, 1981, Ser. No. 270,851

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1980, 3023765

Int. Cl.³ C07C *67/04, 67/38*

U.S. Cl. 260—410.9 R **8 Claims**

1. In a process for preparing an alkyl ester of a saturated aliphatic carboxylic acid by reacting olefin with alkanol and carbon monoxide in the presence of a catalyst consisting of a cobalt compound and a promoter selected from the group consisting of pyridine, non-ortho-substituted alkylpyridine, and mixtures thereof to form a reaction mixture, the improvement consisting essentially of recovering and reactivating said catalyst by:

(a) treating said reaction mixture with a gas containing oxygen and forming an oxidized cobalt compound;

(b) carrying out a first distillation in a first distillation stage at a given pressure to produce a first sump product containing said oxidized cobalt compound and a first distillate free of cobalt;

(c) carrying out a second distillation of said first sump product in a second distillation stage at a pressure less than said given pressure to produce a second sump product containing substantially all of said oxidized cobalt compound as a cobalt concentrate free of promoter and a second distillate free of cobalt and containing said promoter, unconverted alkanol having more than 5 carbon atoms, olefins with more than 8 carbon atoms and said alkylester formed as a reaction product;

(d) mixing all of said cobalt concentrate in said promoter to form a suspension;

(e) treating said suspension with a mixture of carbon monoxide and hydrogen at a temperature of about 100° to 250° C. and at a pressure of at least 50 bars to form a treatment product; and

(f) feeding back said treatment product to said reacting olefin with alkanol and carbon monoxide.

4,421,692

PROCESS FOR PRODUCING CARBOXYLIC ACID ALKYLESTER AFTER PRODUCTS EXTENSIVELY FREE FROM NITROGENATED COMPOUNDS

Peter Hofmann, and Wolfgang H. E. Müller, both of Marl, Fed. Rep. of Germany, assignors to Chemische Werke Hüls AG, Marl, Fed. Rep. of Germany

Filed Nov. 5, 1981, Ser. No. 318,661

Claims priority, application Fed. Rep. of Germany, Dec. 11, 1980, 3046651

Int. Cl.³ C11C *3/02*

U.S. Cl. 260—410.9 R **6 Claims**

1. In a method for preparing carboxylic acid alkylester after products comprising:

(a) reacting olefins with carbon monoxide and alkanols in the presence of a catalyst system consisting essentially of a cobalt compound and a promoter selected from the group consisting of pyridine, non-orthosubstituted alkylpyridines or mixtures thereof at elevated temperatures and elevated pressures to produce carboxylic acid alkylesters having compounds containing nitrogen resulting from said promoter; and

(b) hydrogenating said carboxylic acid alkylesters to produce after products which include alcohols;

the improvement comprising freeing said after products of said compounds containing nitrogen by:

(c) hydrogenating said compounds containing nitrogen simultaneously with said carboxylic acid alkylesters; and

(d) separating said hydrogenated compounds containing nitrogen from said after products with acid ion exchangers.

4,421,693

AMINOSULFENYL CHLORIDE DERIVATIVES

Takeshi Goto; Takashi Soeda; Nobuyoshi Asai, and Akira Tanaka, all of Tokushima, Japan, assignors to Otsuka Chemical Co., Ltd., Osaka, Japan

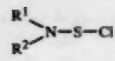
Filed Mar. 25, 1982, Ser. No. 361,931

Claims priority, application Japan, Mar. 30, 1981, 56-47785; May 22, 1981, 56-78529; Nov. 5, 1981, 56-177928; Nov. 5, 1981, 56-177929

Int. Cl.³ C07C *161/00*

U.S. Cl. 260—464 **1 Claim**

1. An aminosulfenyl chloride derivative represented by the formula (I):



(I)

wherein R^1 and R^2, which may be the same or different, each represents (1) —X—$COOR^3$, in which X represents an alkylene group having 1 to 6 carbon atoms, and R^3 represents an alkyl group having 1 to 8 carbon atoms or a cycloalkyl group having 3 to 6 carbon atoms; or (2) —Y—CN, in which Y represents an alkylene group having 1 to 6 carbon atoms; and R^2 further represents an alkyl group having 1 to 8 carbon atoms; a cycloalkyl group having 3 to 6 carbon atoms; a benzyl group which may be substituted with a halogen atom, an alkyl group having 1 to 3 carbon atoms or an alkoxy group having 1 to 3 carbon atoms; a phenyl group which may be substituted with a halogen atom, an alkyl group having 1 to 3 carbon atoms or an alkoxy group having 1 to 3 carbon atoms; or —Z—R^4, in which Z represents a carbonyl group or a sulfonyl group, and R^4 represents an alkyl group having 1 to 6 carbon atoms, a phenyl group which may be substituted with an alkyl group having 1 to 3 carbon atoms or a halogen atom, an alkoxy group having 1 to 3 carbon atoms or a phenoxy group.

4,421,694

PROCESS FOR THE PREPARATION OF NITROANILINES

Bruno Kruger, Cologne; Adolf Winkler, Leverkusen, and Gunter Hentze, Odenthal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

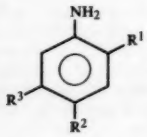
Filed Jan. 20, 1982, Ser. No. 340,901

Claims priority, application Fed. Rep. of Germany, Feb. 7, 1981, 3104310

Int. Cl.³ C07C *85/04, 120/00*

U.S. Cl. 260—465 E **13 Claims**

1. A process for the preparation of a nitroaniline of the formula



wherein

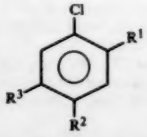
R^1 represents halogen, a cyano group, a nitro group, a carboxyl group, an acyl group or a sulpho group,

R^2 represents hydrogen, a nitro group or a carboxyl group and

R^3 denotes hydrogen or halogen,

and wherein

at least one of the radicals R^1 or R^2 represents a nitro group, which comprises contacting a chloronitrobenzene of the formula



wherein R^1, R^2 and R^3 have the meaning given above, with ammonia, at elevated temperature and under elevated pressure in the presence of a chlorinated aromatic hydrocarbon.

4,421,695

PRODUCTION OF ALKOXYALKYL PHOSPHATE ESTERS

Norman C. Parsons, Winfield, W. Va., and Joseph H. Finley, Metuchen, N.J., assignors to FMC Corporation, Philadelphia, Pa.

Filed Apr. 7, 1982, Ser. No. 366,265

Int. Cl.³ C07F *9/09*

U.S. Cl. 260—974 **4 Claims**

1. In the process for making trisubstituted phosphate esters in which six moles of an alkoxyalkanol of the formula

$R_1—O—R_2OH$

in which R_1 contains 1 to 6 carbon atoms and R_2 contains 1 to 4 carbon atoms, (a) is continuously reacted with 3 to 4 moles of an alkalimetal hydroxide in a non-oxidizing atmosphere to produce the corresponding alkali metal alkoxide while concurrently removing substantially all of the water formed in said reaction to produce a substantially anhydrous reaction mixture and (b) reacting this reaction mixture with phosphorus oxychloride in a non-oxidizing atmosphere at a temperature in the range of 0° to 100° C. to produce a product mixture containing the product ester of said alcohol and (c) separating the ester from the reaction mixture the improvement which comprises treating the alkoxyalkanol with 100 to 150 parts per million of sodium borohydride for at least 20 minutes before reacting the alkoxyethanol with the alkali metal hydroxide.

4,421,696

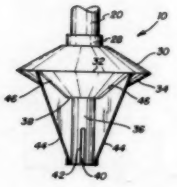
GAS DIFFUSER

William D. Graue, 4228 N. Central Exp./208, Dallas, Tex. 75206, and Leo J. Oros, 440 N. Foster, Suite 303, Baton Rouge, La. 70806

Filed Apr. 10, 1981, Ser. No. 252,820

Int. Cl.³ B01F *3/04*

U.S. Cl. 261—123 **2 Claims**



1. A gas diffuser comprising:

(a) coupling means for rigidly and air-tightly connecting the gas diffuser to a source of gas supply;

(b) a frustro-conical directional distribution surface having a vertical central axis and diverging in an upward direction to terminate at a sharp circular shear edge, said directional distribution surface being attached to said coupling means;

(c) a distribution tube which is attached to said directional distribution surface which extends in a downward direction from said directional distribution surface;

(d) a plurality of port edges disposed in said distribution tube which define a plurality of slot-shaped distribution ports beneath said directional distribution surface such that gas streams escaping from said distribution ports rise under the influence of buoyancy, impinge upon said directional distributional surface, are evenly distributed to said shear edge, and are dispersed at the shear edge as bubbles; and

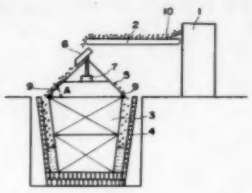
(e) a plurality of drift control vanes extending from said distribution tube to said shear edge to control the distribution of gas streams to said shear edge.

4,421,697

METHOD AND APPARATUS FOR CASTING AN INNER LINING AMORPHOUS REFRACTORY INTO A MOLTEN METAL VESSEL

Kiyomi Taguchi; Osamu Terada; Noriaki Morishita; Hiroshi Mihashi, all of Fukuyama, and Seiji Nagai, Hiroshima, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed May 7, 1982, Ser. No. 375,716
Claims priority, application Japan, May 15, 1981, 56-72136
Int. Cl.³ F27D *1/16*
U.S. Cl. 264—30 6 Claims



1. A lining method wherein when a lining frame is positioned within a molten metal vessel preliminarily lined with a permanent lining refractory and an amorphous refractory is casted into a space between said permanent lining refractory and said lining frame to thereby apply a lining to said vessel, while rotating a chute above a conical distributor, said amorphous refractory is caused to continuously fall down onto said distributor so as to describe a concentric path of moving falling points, and said amorphous refractory is dropped over a conical inclined surface of said distributor to fall into said space from an outer periphery of said distributor.

2. An apparatus of the type in which a lining frame is positioned within a molten metal vessel preliminarily lined with a permanent lining refractory and an amorphous refractory is casted into a space between said permanent lining refractory and said lining frame thereby applying a lining to said vessel, said apparatus comprising:

a conical distributor arranged above said lining frame for distributing a stream of said amorphous refractory to fall down from the outer periphery thereof into said space; and

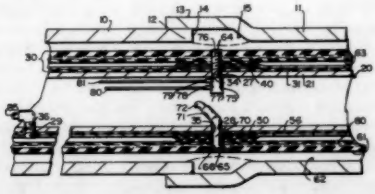
a chute rotatable to cause said amorphous refractory to fall down onto a conical inclined surface of said distributor such that falling points of said amorphous refractory describe a circular path of movement concentric with said conical shape of said distributor.

4,421,698

SEALING DEVICE FOR USE IN GROUTING PIPE JOINTS AND METHOD OF USING SAME

Gerald J. Vanderlans, 1310 W. Turner Rd., Lodi, Calif. 95240

Filed Aug. 16, 1982, Ser. No. 408,436
Int. Cl.³ B28B *7/32, 21/20*; B29C *1/12*
U.S. Cl. 264—40.1 6 Claims



1. A method for the economic and controlled application of grout at each of a series of joints in a pipeline, including:

positioning in said pipeline opposite one joint at a time a short cylindrical tube having an outer wall somewhat smaller in diameter than the inner diameter of said pipeline, said tube having an inner rigid portion and an outer flexible portion bonded to said rigid portion only at each end, said tube having a through opening at about its axial center, said flexible portion having a cavity therein at about said axial center, spaced from said through opening, filled with liquid by a flexible conduit sealed to said flexible portion and extending from said cavity into the interior of said tube to a pressure gauge,

sending air into the space between said flexible and rigid portions to swell said flexible portion and urge said outer wall into contact with the inner wall of the pipeline on each side of a said joint, thereby sealing off that space,

observing the pressure exerted on said liquid and therefore applied to the outer wall at said joint, and

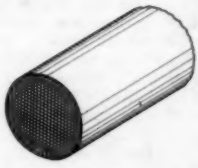
sending grout into the space in said joint between said pipeline and said tube via a fitting member secured in said through opening, when the pressure of said liquid reaches a predetermined amount.

4,421,699

METHOD FOR PRODUCING A CORDIERITE BODY

Kazuhiro Inoguchi, Okazaki; Tomohiko Nakanishi, Kariya, and Mitsuru Asano, Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Apr. 2, 1981, Ser. No. 250,151
Claims priority, application Japan, Apr. 4, 1980, 55-45018
Int. Cl.³ C04B *35/18*
U.S. Cl. 264—56 13 Claims



1. A method of producing a cordierite body having a coefficient of thermal expansion of less than 10.5×10^{-7}/°C. comprising the steps of:

(1) mixing together and kneading a batch raw material containing tubular-shaped halloysite particles and plate-shaped talc particles delaminated along the (OOl) plane thereof,

said halloysite particles including at least one material selected from the group consisting of halloysite, metahalloysite, endellite and allophane;

(2) anisostatically forming the mixed batch raw material into a formed body thereby imparting a planar orientation to said plate-shaped talc particles contained in said batch raw material; and

(3) drying and firing the thus formed body.

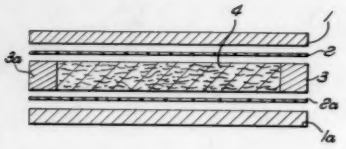
4,421,700
METHOD AND TECHNIQUE FOR INSTALLING LIGHT-WEIGHT, FRAGILE, HIGH-TEMPERATURE FIBER INSULATION

Bhanu C. Patel, Northridge, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Continuation of Ser. No. 185,868, Sep. 11, 1980, abandoned, and Ser. No. 969,757, Dec. 15, 1979, abandoned. This application Mar. 25, 1982, Ser. No. 361,711

Int. Cl.³ C04B *33/32*

U.S. Cl. 264—59 **6 Claims**



1. A method of installing light-weight, fragile, high-temperature fiber insulation, comprising:

preforming a roughly dimensioned shape of said insulation oversized in at least one dimension in respect to a cavity into which said insulation is to be placed;

saturating said shape with an aqueous solution of an acrylic polymer resin curable at a first temperature to form a relatively rigid mass and substantially completely fugitive at a second higher temperature;

compressing said saturated mass to form a shape undersized with respect to said cavity;

drying said undersized shape and curing it at said first temperature to form said rigid mass;

emplacing said rigid mass in said cavity to form an assembly;

and baking said assembly at said second temperature to drive off said resin thereby releasing said fiber insulation to expand and substantially fill said cavity.

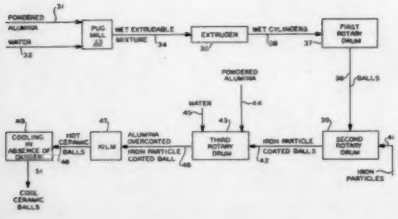
4,421,701
PROCESS FOR PREPARING IRON-CONTAINING REFRACTORY BALLS FOR RETORTING OIL SHALE

Lyle W. Pollock, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 209,926, Nov. 24, 1980, Pat. No. 4,371,481, which is a division of Ser. No. 9,627, Feb. 6, 1979, Pat. No. 4,360,565, which is a division of Ser. No. 837,130, Sep. 28, 1977, Pat. No. 4,160,719. This application Sep. 30, 1982, Ser. No. 430,634

Int. Cl.³ B01J *2/00*

U.S. Cl. 264—60 **7 Claims**



1. A process for preparing iron-containing ceramic balls, containing about 10 to 90 weight percent iron and the balance a high ,efractory alumina, which comprises:

(a) pelletizing finely divided powdered refractory-grade alumina with sufficient water to form alumina pellets,

(b) inserting into each said alumina pellet an iron shot, thereby producing a pellet containing an iron shot,

(c) firing said iron shot-containing alumina pellet at a temperature in the range of about 2800° F. to 3400° F. for a time sufficient to produce said iron-containing ceramic balls, and

(d) cooling said fired ceramic balls in the substantial absence of molecular oxygen,

wherein said iron-containing ceramic balls in cross-section contain a metallic iron core and an alumina-ceramic overcoating.

4,421,702
CERAMIC RECUPERATIVE HEAT EXCHANGERS AND A METHOD FOR PRODUCING THE SAME

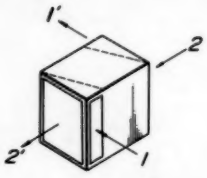
Isao Oda, and Tadaaki Matsuhisa, both of Nagoya, Japan, assignors to NGK Insulators Ltd., Nagoya, Japan

Filed Mar. 16, 1981, Ser. No. 243,698

Claims priority, application Japan, Mar. 24, 1980, 55-37333

Int. Cl.³ B29D *23/04*

U.S. Cl. 264—62 **5 Claims**

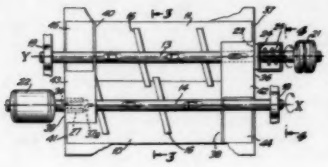


1. A method for producing ceramic recuperative heat exchangers having a large number of parallel channels formed of partition walls such that flowing fluids are capable of being heat-exchanged through respective channels, in which the sectional shape of the channels and thickness of the partition walls are substantially uniform, the open frontal area of the heat transmitting portion where the fluids are heat-exchanged being more than 60% and the porosity of the ceramic material forming the partition walls simultaneously being not more than 10%, which comprises: adding to ceramic material at least some water, an organic solvent, and a forming aid, kneading thoroughly the resulting mixture to prepare a raw batch material; extruding the raw batch material into a honeycomb structural body having a large number of axially extended channels in which the sectional shape of the channels and the thickness of the partition walls are substantially uniform, the channels being arranged generally into rows; drying the shaped honeycomb structural body; prior to or after firing, cutting off partition walls in particular rows of the honeycomb structural body in the axial direction of the channels to a given depth from the end surface of the honeycomb structural body; and sealing only the end surfaces of said rows with a suitable sealing means, such that the open frontal area of the heat transmitting portion is at least 60%, and the porosity of the ceramic is no more than 10% after the conclusion of said sealing step.

4,421,703
HEAT TREATING OF MATERIAL IN FINELY DIVIDED FORM

Friedhelm R. Feder, Collierville, Tenn., assignor to Wedco Inc., Bloomsbury, N.J.

Continuation of Ser. No. 139,630, Apr. 14, 1980, abandoned. This application Sep. 10, 1982, Ser. No. 416,747
Int. Cl.³ B29C 19/02
U.S. Cl. 264—68 15 Claims



1. Process of heat treating a finely divided particulate polymer material which comprises:

introducing the material into a material introduction location disposed in at least one of at least two intersecting, axially parallel disposed, generally cylindrical drums, filled with a fluid; heating and dispersing the material in the fluid at least in the vicinity of the wall of each drum throughout the circumference of each drum by agitating the material with an agitator comprising a rotor disposed over a length of each drum and having radially projecting, axially spaced blades for causing the simultaneous agitation and heating of the material to a desired temperature within the drums, wherein the intersection of the drums provides an open area between the two drums and the agitating causes particles from one drum to mix with particles of the other drum in the vicinities on either side of the open area; regulating the temperature within the drums to maintain the desired temperature and withdrawing heat treated material from a first material withdrawal location disposed at least in one of the drums at a location diagonally across the agitators from the material introduction location.

4,421,704
METHOD OF TREATMENT FOR PLASTER ARTICLES TO IMPROVE WEAR AND WATER RESISTANCE AND ARTICLE OF MANUFACTURE

William S. Reily, Des Plaines, Ill., assignor to United States Gypsum Company, Chicago, Ill.

Division of Ser. No. 168,971, Jul. 14, 1980, Pat. No. 4,350,736. This application Feb. 8, 1982, Ser. No. 346,964
Int. Cl.³ B29C 13/00
U.S. Cl. 264—133 21 Claims

1. A method of surface treatment for plaster articles to improve wear and water resistance, said method comprising the steps of

forming a plaster and water slurry,

allowing said slurry to set into a dimensionally stable plaster article,

drying said article to remove excess water,

applying a coat of substantially molten Candelilla wax onto an exterior surface of said article in an amount no less than about 0.020 pounds per square foot (0.010 grams per square centimeter),

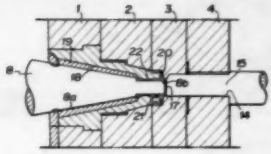
maintaining said wax at a temperature of no less than about 155° F. (68° C.), for a sufficient period of time to allow said wax to substantially fill exterior pores and irregularities of said exterior surface while avoiding degradation of the set plaster, and

cooling said article to solidify the wax.

4,421,705
METHOD AND APPARATUS FOR ATTACHING SEALING PIECE ONTO POUR-OUT HOLE OF PLASTIC CLOSURE CAP OR CONTAINER

Yoshiharu Hatakeyama, Tokyo, and Susumu Kimura, Yachiyo, both of Japan, assignors to Yoshida Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 251,941, Apr. 7, 1981, abandoned. This application Sep. 23, 1982, Ser. No. 422,432
Int. Cl.³ B29C 6/04, 17/10; B29D 23/02
U.S. Cl. 264—153 7 Claims



1. A method for attaching a removable sealing piece onto an end of a plastic closure cap or container to seal a pour-out hole through such end, while forming said closure cap or container by injection molding, said method comprising:

providing members defining an injection molding cavity for molding the closure cap or container, said cavity being open an an end portion to define a pour-out hole of said closure cap or container;

providing a continuous sealing strip having a thermoplastic layer;

intermittently advancing said strip in a direction transverse to the axis of said pour-out hole to position a portion of said strip at a location spaced from and confronting said open end portion of said cavity;

providing a molding member adjacent a side of said strip opposite said cavity, said molding member having a tip with a shaft edge;

advancing said molding member toward said strip in the direction of said axis, punching a sealing piece from said portion of said strip by said sharp edge of said tip, and conveying said sealing piece in said direction of said axis toward said cavity by means of said molding member only, while maintaining said cavity defining members immobile until said sealing piece reaches a position closing said open end portion of said cavity; and

injecting a thermoplastic resin having chemical affinity with said thermoplastic layer into said cavity, thereby forming said closure cap or container and simultaneously joining said thermoplastic layer of said sealing piece to an end of said closure cap or container.

4. An apparatus for fomring a plastic closure cap or container by injection molding, while attaching a removable sealing piece onto an end of the closure cap or container to seal a pour-out hole through such end, said apparatus comprising:

an injection molding device including members defining a cavity for molding the closure cap or container, said cavity being open at an end portion to define a pour-out hole of the closure cap or container;

means for intermittently advancing a sealing strip having a thermoplastic layer in a direction transverse to the axis of the pour-out hole to position a portion of said strip at a location spaced from and confronting said open end portion of said cavity;

a molding member positioned adjacent a side of said strip opposite said cavity, said molding member having a tip with a sharp edge;

means mounting said molding member for advancement in the direction of said axis toward said strip, for causing said sharp edge of said tip to punch a sealing piece from said portion of said strip, and for conveying said sealing piece in said direction of said axis toward said cavity by means

of said molding member only, with said cavity defining members of said injection molding device being maintained immobile, until said sealing piece reaches a position closing said end portion of said cavity; and

means for injecting a thermoplastic resin having a chemical affinity with said thermoplastic layer into said cavity, thereby for forming the closure cap or container and simultaneously for joining said thermoplastic layer of said sealing piece to an end of said closure cap or container.

4,421,706

METHOD OF MANUFACTURING PRINTING HEADS FOR INK JET PRINTERS

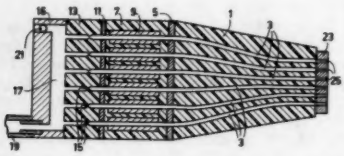
Johannes Feenstra; Hermanus N. Tuin, and Antonie Schrederhof, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 19, 1982, Ser. No. 359,644

Claims priority, application Netherlands, Apr. 24, 1981, 8102026

Int. Cl.³ B29C *17/10*

U.S. Cl. 264—157 **6 Claims**



1. A method of manufacturing printing heads for ink jet printers by forming moulded coupling pieces (1) for conveying a liquid from a reservoir (17) containing said liquid to jet nozzles (25) for ejecting said liquid, each of said coupling pieces containing jet nozzle ducts (3) extending from said reservoir to said jet nozzles which ducts in each coupling piece are closer to each other in the area adjacent to the jet nozzles then in the area adjacent to the reservoir and positioning around each jet nozzle duct a cylindrical pumping member (9) in an area closer to the reservoir then to the jet nozzles, characterized in that:

(1) a bundle of parallel glass tubes (27) are positioned so as to extend through corresponding openings (29) contained in two spaced parallel alignment plates (5), the openings in each of said plates corresponding to the desired arrangement of the jet nozzle ducts, said alignment plates dividing said bundle into a central portion (31) extending between said two alignment plates and two end portions (33), each of said end portions being situated outside of said central portion and each having a length at least equal to the length of said pumping members;

(2) heating said bundle sufficiently to soften said glass tubes;

(3) constricting the thus softened glass tubes in said central portion in a manner such that the tubes are closest to each other along a separation plane (37) about halfway between, and extending parallel to, said two alignment plates to thereby form a pattern corresponding to the desired arrangement of the jet nozzles at the front of two coupling pieces, said coupling pieces being joined, one to the other, at the front of the jet nozzles;

(4) embedding at least said central portion of said bundle in a molding composition and setting said molding composition thereby forming two coupling pieces joined together at the front of said jet nozzles; and

(5) then separating said coupling pieces from each other along said separation plane (37) thereby forming two separate coupling pieces.

4,421,707

ACRYLIC WET SPINNING PROCESS

Raymond E. Kourtz, and Shashikumar H. Daftary, both of Pensacola, Fla., assignors to American Cyanamid Company, Stamford, Conn.

Filed Apr. 29, 1982, Ser. No. 373,090

Int. Cl.³ D01F *6/18*

U.S. Cl. 264—182 **5 Claims**

1. A process for preparing an acrylonitrile polymer fiber which comprises preparing a spinning composition of a fiber-forming acrylonitrile polymer in an aqueous thiocyanate salt solution, said polymer having a composition of about 80 to about 95 weight percent acrylonitrile, from about 5 to about 12 weight percent of methyl methacrylate and any balance of a comonomer free of acid dyesites and said polymer having a number average molecular weight in the range of about 9,000 to about 14,750, said spinning composition having a polymer concentration in the range of about 12.5 to 16.0 weight percent in an aqueous thiocyanate salt solution in which the thiocyanate salt content is in the range of about 38 to 45 weight percent based on the total weight of water and polymer and said spinning solution having a viscosity in the range of 28–60 poise determined by the falling ball method at 40° C., extruding said spinning solution into a dilute aqueous thiocyanate salt solution to form a wet-gel fiber, washing and stretching the wet-gel fiber to remove thiocyanate salt and provide polymer orientation and thereafter collapsing the wet-gel structure.

4,421,708

PROCESS FOR THE PRODUCTION OF HIGH-STRENGTH FILAMENTS FROM DRY-SPUN POLYACRYLONITRILE

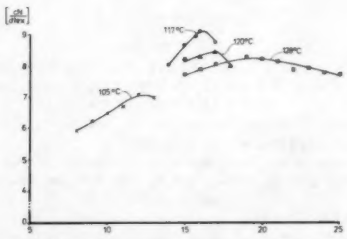
Manfred Reichardt, Dormagen; Christian Pieper, Neuss; Alfred Nogaj, Dormagen; Surinder S. Sandhu, Dormagen, and Eckhard Gärtner, Dormagen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Feb. 4, 1982, Ser. No. 345,845

Claims priority, application Fed. Rep. of Germany, Feb. 13, 1981, 3105360

Int. Cl.³ D01F *7/00*

U.S. Cl. 264—206 **10 Claims**



1. A process for the production of high-strength filaments of polyacrylonitrile by dry-spinning, comprising

(a) producing a spun material at take-up speeds of from 500 to 200 m/min. from acrylonitrile polymers having a molecular weight of more than 170,000 (weight average) and 50,000 (number average) using spinning solutions in which super-molecular structures in the solution characterized by reduced viscosity for the same polymer content, the same temperature and the same molecular weight are degraded by the following methods individually or collectively:

(i) tempering the spinning solution for at least 5 minutes at temperatures above 120° C.,

(ii) using polymer contents in the solution such that the solution has a dynamic viscosity at 120° C. of less than 40 Pas,

(iii) introducing additives having a viscosity-reducing effect,

or to produce tension-reduced spun filaments producing a spun material from a tow produced at normal take-up speeds of from 200 to 400 m/min. and subsequently subjecting said material to a hydrothermal treatment at temperatures $\theta=\theta_o$ with $\theta_{O,5}<\theta_o\leqq\theta_n+50°$ C. and to produce tension-reduced spun filaments,

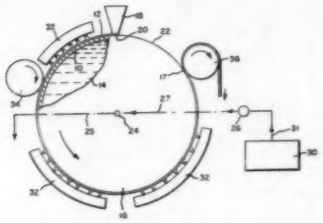
(b) stretching the tension-reduced spun filaments continuously hydrothermally in one or more stages such that where it involves several stages, stretching at a temperature of the stretching medium gradually increasing from stage to stage of up to $\theta=\theta_n$ and, in the final (n-th) stage, to a degree of at least 50% of the maximum degree of stretching; where it involves a single stage, stretching at the optimal stretching temperature θ_n and treating the material thereafter in a conventional way.

4,421,709

HIGH CAPACITY POLYMER QUENCHING ON THIN SHELL WHEELS

Neil I. Steinberg, Greer, S.C., assignor to E. I. Du Pont de Nemours & Co., Wilmington, Del.

Filed Jan. 10, 1983, Ser. No. 458,869
Int. Cl.³ B29D *7/02*
U.S. Cl. 264—216 **6 Claims**



1. In a method of forming a polymeric film by casting a molten web of a thermoplastic film-forming polymer on the surface of a rotating casting wheel, cooling the under surface of the molten web on the casting surface to a temperature and depth sufficient to permit stripping it from said casting surface, and subsequently stripping the web from the casting surface; the improvement wherein the production capacity is increased by reducing the shell thickness of the casting wheel to a thickness in inches of less than 0.1875 times the casting wheel diameter in feet but no greater than 0.9375 inches and not less than $4.7\times D^{0.5}\times E^{-0.25}$ where D is the wheel diameter in feet, and E=the modulus of elasticity of the wheel shell in psi.

4,421,710

METHOD, DEVICES, MOLD BEARING STRUCTURES AND INSTALLATIONS FOR IMPROVING THE EFFICIENCY OF PROCESSES FOR THE MANUFACTURE OF PRESTRESSED CONCRETE PRODUCTS

Mircea Borcoman, 11, rue du Général Henrion Bertier, 92200 Neuilly sur Seine, France

Filed Jan. 25, 1982, Ser. No. 342,090
Claims priority, application France, Feb. 4, 1981, 81 02087
Int. Cl.³ B28B *23/04*; B23K *1/20*
U.S. Cl. 264—228 **22 Claims**

1. A method of manufacturing concrete products prestressed by bonded reinforcements, comprising the steps of:

using movable and self-supporting screens for closing molds at both ends and anchoring reinforcements such as wires and strands;

after tensioning the reinforcements, and molding concrete in molds, and after hardening of concrete, particularly by passing filled molds through a heat treatment installation, stripping the products with transfer of the prestressing forces to the end screens;

then, passing the stripped products through a cooling installation;

and, after the passage of said products through the cooling installation, the concrete having acquired additional strength with respect to that which it had on stripping, effecting the transfer of the prestressing forces to the concrete by bonding, and then recovering the self-supporting screens.

4,421,711

MOLDING OF ELONGATE, HOLLOW, BIAXIALLY ORIENTED THERMOPLASTIC SHAPED ARTICLES

Claude Bonnebat, Pontault Combault, and Louis Macabrey, Mitry-le-Neuf, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Jun. 8, 1981, Ser. No. 271,380
Claims priority, application France, Jun. 13, 1980, 80 13158
Int. Cl.³ B29C *17/07*
U.S. Cl. 264—529 **8 Claims**

1. A process for the manufacture of an elongate, rigid, tubular, biaxially oriented thermoplastic, hollow thin-walled shaped article which is open at both ends, has an internal diameter or inscribed diameter equal to at least 2 cm, and a length to diameter ratio of at least about 10/1 comprising (i) introducing into an elongate mold cavity, the internal configuration and dimensions thereof corresponding to the exterior surface area of the desired shaped article, and aligning along the longitudinal axis thereof, a long tubular thermoplastic blank which is open at both ends and which is heated to the biaxial orientation temperature of said thermoplastic; (ii) expanding under internal fluid pressure in the absence of mechanical stretching means said heated tubular blank to simultaneously, both longitudinally and transversely, uniformly stretch same, at least to the natural biaxial drawing ratio thereof, but to a value in the transverse direction of less than 100% of that ultimately desired so as to avoid any contact between the tubular blank and the internal walls of the mold cavity prior to the completion of said longitudinal stretching; (iii) next further expanding said heated tubular blank, under increased internal pressure, completely against the internal walls of the mold cavity to thus completely shape said ultimately desired shaped article; and (iv) thence cooling said desired shaped article and releasing all pressure therefrom.

4,421,712

CONTINUOUSLY ROTARY THERMO-FORMING SYSTEMS AND APPARATUS OF THE PRESSURE ASSIST, PLUG ASSIST AND MATCH MOLD TYPE

Thomas W. Winstead, Cockeysville, Md., assignor to Maryland Cup Corporation, Owings Mills, Md.

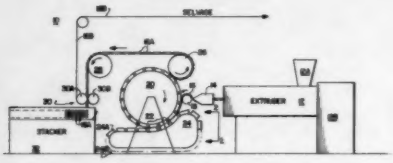
Filed Aug. 13, 1980, Ser. No. 177,582
Int. Cl.³ B29C *3/02*; B29F *5/00*
U.S. Cl. 264—551 **12 Claims**

1. The method of thermoforming an extruded thermoplastic web having heat of extrusion retained therein and being in a thermoformable state, comprising:

receiving said web on the peripheral surface of a rotating mold wheel having mold cavities defined in the said peripheral surface;

applying a vacuum to said web from within said mold cavities to impart a drawing force to said web tending to ingest discrete areas thereof into said mold cavities;

providing draw assisting devices moving continuously along a conformally arcuate path with and adjacent to the periphery of said mold wheel in registry with said mold cavities over a predetermined arc of registration, said assisting devices also being reciprocated axially into and from said mold cavities to impart said draw assisting force;



constraining said draw assisting devices to impart a draw assisting external force to said discrete areas of said web over said predetermined arc of registration in conjunction with and in enhancement of said drawing force imparted by the said application of vacuum internally thereof;

removing said draw assisting external force from said web;

subsequently removing said drawing force from said web; and

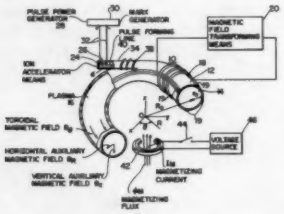
thereafter removing said web and said thermoformed products from said mold wheel and said die cavities, respectively.

4,421,713

TOKAMAK PLASMA HEATING WITH INTENSE, PULSED ION BEAMS

Wallace M. Manheimer, Silver Spring, Md., and Niels K. Winsor, Alexandria, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 25, 1981, Ser. No. 247,420
Int. Cl.³ G21B *1/02*
U.S. Cl. 376—127 **5 Claims**



1. Apparatus for heating a plasma, the plasma being confined in an apparatus of the type wherein the plasma is confined in a vacuum chamber by a magnetic field, and no plasma current is initially carried by the plasma, comprising:

means for producing a space-charge-neutralized, pulsed, ion beam;

means for directing the ion beam into the plasma-confining chamber,

means for transforming the magnetic field to one which can trap the ion beam at the center of the plasma; and

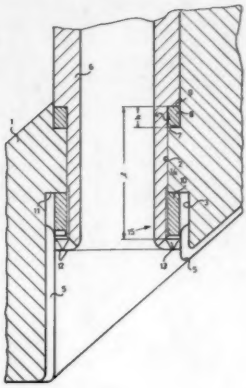
means for cancelling a plasma return current inductively generated in the plasma by the ion beam current so that a net current is produced which is carried by the ion beam alone, and which is dissipated by the ion beam's transferring its energy to the plasma by classical collisions with the electrons and ions of the plasma.

4,421,714

NOZZLE PENETRATION FOR A NUCLEAR REACTOR PRESSURE VESSEL CLOSURE

Peter Dronkers, Mannheim, Fed. Rep. of Germany, assignor to The Babcock & Wilcox Company, New Orleans, La.

Filed Nov. 28, 1980, Ser. No. 211,141
Claims priority, application Fed. Rep. of Germany, Dec. 22, 1979, 2952025
Int. Cl.³ G21C *13/00*
U.S. Cl. 376—204 **2 Claims**



1. A nozzle penetration for a nuclear pressure vessel closure head comprising:

a closure head made of ferritic material having an inside cladding of austenitic material;

a nozzle composed of an alloy of the Ni Cr 15 Fe type having a shoulder portion intermediate its two ends penetrating said closure head and connected thereto by frictional engagement;

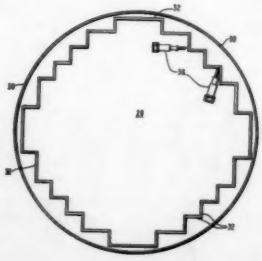
a compensating ring of austenitic material seated between said shoulder and a support surface of said closure head.

4,421,715

BAFFLE MAINTENANCE APPARATUS

John B. Gunter, Pittsburgh, Pa.; George J. Quinn, Spartanburg, S.C.; Edward P. Shields, N. Huntingdon Township, Huntingdon County, Pa.; Burton S. Thomas, Bethel Park, Pa., and Clifford J. Winkler, Plum Borough, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 4, 1981, Ser. No. 270,458
Int. Cl.³ G21C *17/00, 19/00*
U.S. Cl. 376—245 **19 Claims**



1. Baffle maintenance apparatus for reducing the size of gaps between baffle plates in a nuclear reactor comprising:

a support member capable of being positioned in a nuclear reactor;

a carriage slidably disposed on said support member; and

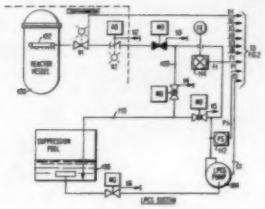
reducing means disposed on said carriage and arranged to contact said baffle plates for deforming at least one of said baffle plates thereby reducing the gap between said baffle plates.

4,421,716

SAFETY MONITORING AND REACTOR TRANSIENT INTERPRETER

John E. Hench, and Tom Y. Fukushima, both of San Jose, Calif., assignors to S. Levy, Inc., Campbell, Calif.

Filed Dec. 29, 1980, Ser. No. 221,327
Int. Cl.³ G21C 7/36
U.S. Cl. 376—216 **6 Claims**



1. For use in a nuclear reactor power plant, including a reactor vessel having a reactor core, said power plant having a number of first subsystems utilized for operating said plant during normal operating conditions, a number of second subsystems utilized for operating said plant during abnormal and accident operating conditions, and a control panel for displaying plant parameters relating to plant operation, said first and second subsystems including subsystems that add water to said reactor vessel, and subsystems that take water away from said reactor vessel, a transient interpreter comprising:

A. means (36) connected to said first and second subsystems for receiving signals representing the values of various ones of said plant parameters;

B. interpreter logic means (22) responsive to said receiving means (36) for analyzing said ones of said plant parameters, said interpreter logic means including:

means for determining the instantaneous water inventory of said reactor vessel by monitoring the parameters of those of said first and second subsystems that add water to said reactor vessel, and those of said first and second subsystems that take water away, to provide first data corresponding to the net inflow or outflow of water to said reactor vessel as indicated by directly measured process instrumentation level meters;

means for converting said first data to measured water level data relative to the top of said reactor core;

back-up system means for calculating reactor vessel water level based upon an analytical model of said reactor vessel and said core, said analytical model being based upon the integration of the inflow and outflow of water to said reactor vessel, reactor power, reactor pressure, and reactor water mass, to thereby provide calculated water level data as an alternate to said measured water level data;

means for setting said calculated water level data to be equal to said measured water level data, so that said calculated water level is consistent with said measured water level data as indicated by said directly measured process instrumentation level meters, said means for setting being operative periodically only during normal operation of said plant;

C. first means (14) responsive to said interpreter logic means (22) for generating for display, a primary display, said primary display comprised of information corresponding to primary parameters, said primary parameters comprising a first subset of said plant parameters, said first subset of said plant parameters relating to said first subsystems utilized for operating said plant during normal operating conditions;

D. second means (18, 20) responsive to said interpreter logic means (22) for generating for display, a plurality of secondary displays, each of said secondary displays comprised of information corresponding to secondary parameters, said secondary parameters comprising a second subset of said plant parameters relating to said second subsystems utilized for operating said plant during abnormal and accident operating conditions,

said second means including third means (310) responsive to said determining means within said interpreter logic means (22) for generating a first one of said plurality of secondary displays, said first one secondary display comprised of said calculated water level data; and,

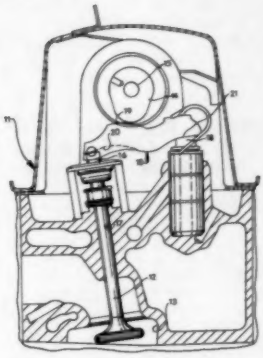
E. fourth means (16, 32, 34) connected to said first means (14) and to said second means (18, 20), said fourth means being selectively operable by an operator, for selecting for display any one of said secondary displays, including said first one of said secondary displays, from said plurality of secondary displays.

4,421,717

METHOD OF MAKING WEAR RESISTANT FERROUS BASED PARTS

Vemulapalli D. N. Rao, Bloomfield Township, Oakland County, Mich., assignor to Ford Motor Company, Dearborn, Mich.

PCT No. PCT/US82/00789, § 371 Date Jun. 10, 1982, § 102(e) Date Jun. 10, 1982
PCT Filed Jun. 10, 1982, Ser. No. 405,136
Int. Cl.³ B22F 3/12
U.S. Cl. 419—27 **19 Claims**



1. A method of making a wear resistant, ferrous based part, comprising the steps of:

(a) molding a uniform mixture of ferrous based powder and binder material into a compacted shape;

(b) heating said compacted shape to remove said binder material and to partially sinter said mixture to a strength of about 1000–8000 psi, while maintaining a porosity of 20–40% at least along the outer region of said part;

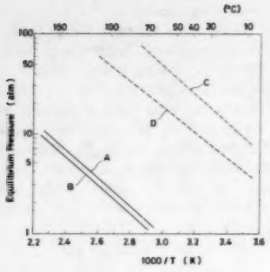
(c) depositing a fluid suspension of refractory wear resistant powder particles onto at least a selected surface zone of said partially sintered shape, said particles coating said zone and permeating the surface region of said zone by absorption as permitted by said porosity; and

(d) heating said coated shape to remove said fluid, to bond said particles to said shape, and to fuse said powder and particles together to define said part.

4,421,718
ALLOY FOR OCCLUSION OF HYDROGEN

Yasuaki Osumi, Minou; Hiroshi Suzuki, Ikeda; Akihiko Kato, Matsubara, and Keisuke Oguro, Ikeda, all of Japan, assignors to Agency of Industrial Science & Technology and Ministry of International Trade & Industry, both of Tokyo, Japan

Filed Sep. 24, 1982, Ser. No. 423,421
Claims priority, application Japan, May 27, 1982, 57-91031
Int. Cl.³ C22C *19/05*
U.S. Cl. 420—443 6 Claims



1. A quaternary hydrogen-occluding alloy with slight hysteresis represented by the general formula:

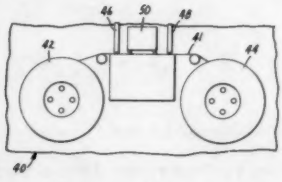
$$RNi_{5-x}Cr_yA_z$$

wherein, R denotes one member selected from the group consisting of rare earth metal atoms and Misch metal, A denotes one metal atom selected from the group consisting of titanium, zirconium, hafnium, vanadium, niobium, and tantalum, x denotes a number falling in the range of 0.01 to 2.0, y denotes a number falling in the range of 0.01 to 2.0, and z denotes a number greater than 0 but not exceeding 0.2, providing that x, y, and z have the relation, $5.0 \leqq 5-x+y+z \leqq 5.2$.

4,421,719
COLORIMETRIC INDICATORS

Malcolm B. Burleigh, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 161,442, Jun. 20, 1980, abandoned. This application Oct. 8, 1981, Ser. No. 309,717
Int. Cl.³ G01N *31/08, 31/22*
U.S. Cl. 422—57 10 Claims



1. A colorimetric indicator in sheet form for the monitoring of a hazardous substance in ambient air comprising a flexible, non-adhesive bearing, organic film backing on wich is coated a colorimetric indicator consisting essentially of

a. an indicator substance selected from permanganate salts,

b. a high surface area carrier for said indicator substance selected from the group consisting of alumina and silica, and

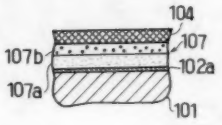
c. a self-adhering bentonite clay mineral binder,

said colorimetric indicator upon exposure to said hazardous substance undergoing an irreversible chemical reaction which progresses, as a function of diffusion, through the depth of the colorimetric indicator resulting in a visually resolvable color change, the rate of said reaction being proportional to the amount of said indicator substance present and the concentration of said hazardous substance to be monitored, said color change indicating that exposure to said hazardous substance has reached a selected time-weighted-average value.

4,421,720
DETECTOR FOR CARBON MONOXIDE CONCENTRATION OF A GAS

Hideo Kamiya, Ekakushinmachi; Hiroshi Shinohara, Okazaki; Yasuhiro Otuka, Toyota, and Mari Okazaki, Chiryu, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed May 28, 1981, Ser. No. 268,055
Claims priority, application Japan, May 29, 1980, 55-072611
Int. Cl.³ G01N *27/16*
U.S. Cl. 422—97 4 Claims



1. A resistance gas sensor comprising:

(a) a forked base from which a pair of arms extend;

(b) a resistance layer forming a resistive element in a bridge circuit disposed of each of said pair of arms, said resistance layers serving both to measure the difference in temperature between said arms and to heat a catalyst layer;

(c) a protective layer means to prevent electrical shorts which might otherwise be caused by deposit of conductive particles contained in a gas to be detected on said resistance layers, said protective layer means comprising an inner protective layer formed from fine ceramic particles disposed over said resistance layers, and an outer protective layer formed from coarse ceramic particles disposed over said inner protective layer; and

(d) a catalyst layer formed on one and only one of said pair of arms in direct contact with said outer protective layer, whereby:

(e) when electricity is passed through said resistance layers, said resistance layers and said catalyst layer are heated

(f) the change in the resistance value of said resistance layer on said one and only one of said pair of arms due to a reaction in a gas promoted by said catalyst layer can be used to calculate the concentration of the gas.

4,421,721
APPARATUS FOR GROWING CRYSTAL FIBERS

Robert L. Byer, Stanford, and Martin M. Fejer, Palo Alto, both of Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Filed Oct. 2, 1981, Ser. No. 308,161
Int. Cl.³ C30B *15/14, 15/32*
U.S. Cl. 422—109 6 Claims

1. Apparatus for growing crystal fibers comprising

a housing,

first drive means within said housing for supporting and driving a feed rod,

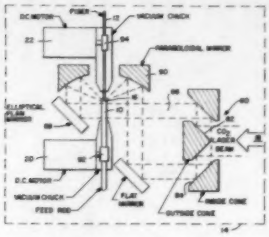
second drive means within said housing for supporting and driving a fiber,

first laser means for generating a laser beam,

transmission means for transmitting said laser beam to said housing, and

optical means within said housing for receiving and expanding said laser beam into a generally annular configuration

and focusing said laser beam on an end of said feed rod, said optical means including a refraxicon portion having inner and outer conical reflecting surfaces for receiving a round laser beam and forming an annular laser beam, an



elliptical mirror and a parabolic mirror, said elliptical mirror receiving said annular laser beam from said refraxicon portion and directing said annular laser beam to said parabolic mirror, said parabolic mirror focusing said annular laser beam on said end of said feed rod.

4,421,722

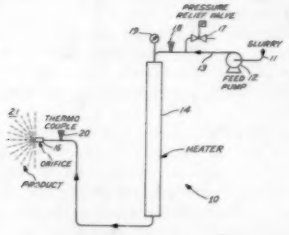
ADIABATIC EXPANSION ORIFICE ASSEMBLY FOR PASSING A SLURRY FROM A HIGH PRESSURE REGION TO A LOW PRESSURE REGION

Lester G. Massey, Moreland Hills; David A. George, Park Forest; Robert I. Brabets, Lombard, and William A. Abel, Joliet, all of Ill., assignors to CNG Research Company, Cleveland, Ohio

Continuation of Ser. No. 127,739, Mar. 6, 1980, abandoned. This application Nov. 16, 1981, Ser. No. 321,750

Int. Cl.³ B01J *8/00*; B05B *1/00*

U.S. Cl. 422—129 **21 Claims**



1. An orifice assembly for passing a slurry from high temperature and pressure conditions to relatively low temperature and pressure conditions, comprising, in combination:

(a) a housing made of material capable of withstanding the flow of an abrasive slurry at high temperature and pressure conditions and having an end wall, an internal chamber and a flange partially closing said internal chamber near said end wall and thereby defining an inner frusto conical surface that opens toward said internal chamber; and

(b) an insert having an outer frusto conical surface that fits within said internal chamber in abuttment and at least partially contacts with said inner frusto conical surface of said flange, and includes a substantially cylindrical passage extending through said insert and communicating with said internal chamber of said housing;

(c) said flange, said insert, and said abuttment of said outer frusto conical tapered surface of said insert against said inner frusto conical surface of said flange defining means for retaining and sealing said insert within said chamber against the flow of slurry under high pressure conditions.

4,421,723

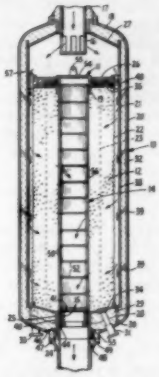
METHOD AND APPARATUS FOR SUPPORTING RADIAL REACTOR CENTERPIPES TO ACCOMMODATE THERMAL CYCLING

Robert A. Farnham, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Jul. 20, 1982, Ser. No. 400,119

Int. Cl.³ B01J *8/02, 35/02*

U.S. Cl. 422—218 **12 Claims**



1. Method of assembling a hydroprocessing reactor wherein an axially elongated reactor vessel includes an internal structure permitting radial flow between the central portion of said vessel, said internal structure being formed by a plurality of elements, each of which is insertable or removable through an access opening in the upper wall of said vessel and each of said internal structure elements being supported by gravity on the lower end wall of said vessel, which comprises

positioning a centralizing socket member to communicate with a flow passageway through said lower end wall of said vessel,

seating the lower end of a centerpipe member in said socket member to centralize said centerpipe in said vessel and to extend it axially parallel to a substantial portion of the length of a sidewall of the vessel,

said centerpipe member including a vertically elongated, constant diameter cylindrical screen member, said screen member having a portion of the surface uniformly permeable for fluid flow therethrough, the lower end of the screen member having an unperforated collar with a length coextensive with said socket member, enclosing within said screen member a perforated pipe havinq a length which is at least coextensive with said screen member,

enclosing said centerpipe screen member within a body of catalyst particles extending outwardly from said screen member, externally confining said particles adjacent said vessel sidewall to form an annular vertical passageway between said vessel sidewall and the so formed cylindrical body of said catalyst particles to permit radial flow of reacting fluids from the cylindrical surface of said body to said centerpipe screen member, and

accommodating axial lifting of said gravity supported centerpipe member from said socket member due to thermal cycling of said catalyst particles and/or said vessel internal elements by extending the length of said socket to exceed the expected maximum lift of said centerpipe member in said socket member.

10. In a radial flow reactor for flowing a hydrocarbon fluid

to be reacted with a solid contact material wherein said reactor comprises:

a vertically elongated vessel having fluid inlet and outlet passageways formed therein;

a vertically elongated centerpipe member, having flow paths formed therethrough, said centerpipe member being vertically movable relative to said vessel;

means for retaining said solid contact material in a generally cylindrical body around said centerpipe member, said means for retaining being arranged around the periphery of said vessel and axially generally coextensive with said centerpipe member;

socket means for independently seating said centerpipe member therein by gravity for vertical insertion or removal of said centerpipe member relative to said vessel; and

low heat conductive means for supporting said socket means on a lower wall of said vertically elongated vessel;

the improvement comprising

a centerpipe member having an elongated, uniformly permeable screen means formed by axially extending rods equally spaced circumferentially to permit substantially unimpeded flow between said rods, a lower end of the screen means including an imperforate collar member axially coextensive with said socket means and secured to a lower end of said rods, and

said socket means having a length sufficient only to accommodate axial lifting of said gravity seated centerpipe member from said socket means within a predetermined distance due to process thermal cycling of said catalyst and/or said vessel internals, including said centerpipe member.

4,421,724

EXTRACTION METHOD FOR REFRACTORY PRECIOUS METAL ORE

Larry B. Hunnel, Rathdrum, Id., assignor to Anglo Mineral Resources, Inc., Beverly Hills, Calif.

Filed Sep. 8, 1981, Ser. No. 299,652

Int. Cl.³ C01G *55/00, 3/00;* **B01D** *11/00;* **B01F** *1/00*

U.S. Cl. 423—22 **12 Claims**

1. A method for effecting cyanic extraction of precious metal from comminuted, refractory precious metal ore, which comprises:

agitationally treating said ore with an aerated, alkaline solution containing (a) water soluble cyanide in an amount from about 112 to about 336 grams of cyanide ion per gallon of solution and (b) chemical oxidizer in an amount from about 0.5 to about 10 grams per gallon of solution, wherein the weight per gallon ratio of ore to solution is from about 500 to about 10,000 grams of ore per gallon of solution.

4,421,725

PROCESS FOR PURIFYING A GAS CONTAINING HYDROGEN SULFIDE AND CARBON DIOXIDE AND APPARATUS THEREFOR

Claude Dezael, Maisons Laffitte, and Sigismond Franckowiak, Rueil Malmaison, both of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

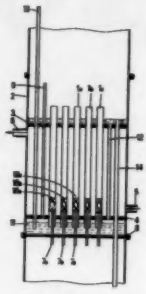
Filed Jul. 9, 1981, Ser. No. 281,798

Claims priority, application France, Jul. 9, 1980, 80 15337

Int. Cl.³ B01D *53/34*

U.S. Cl. 423—228 **7 Claims**

1. In a process for the selective separation of hydrogen sulfide from a gas mixture containing hydrogen sulfide and carbon dioxide, wherein, in an absorption zone, the gas to be treated is contacted with an aqueous solution of an absorbing agent selective for hydrogen sulfide, said absorbing agent being a tertiary alkanolamine in a concentration of 0.5 to 6 moles per liter, so as to separate a gas substantially free of hydrogen sulfide and containing the most part of the carbon dioxide and a solution of high hydrogen sulfide content which is fed to a regeneration zone where a gas of high H_2S content and low CO_2 content is separated to form a regenerated solution which is recycled to the first stage, the improvement comprising conducting the absorption stage in a contact apparatus comprising from 1 to 10 stages, each stage being formed of parallel tubes wherein the gas and the liquid flow co-currently with a swirling motion generated by injection means of the cyclonic type, with a gas velocity from 3 to 30 meters per second, said parallel tubes having a diameter from 8 to 100 mm and a length from 5 to 100 times their diameter.



4,421,726

METHOD OF POLLUTION CONTROL INVOLVING THE ABSORPTION OF SULFUR DIOXIDE FROM STACK GASES

William L. Nikolai, Box 12, Rte. 4, Platteville, Wis. 53818

Filed Jun. 21, 1982, Ser. No. 390,383

Int. Cl.³ C01B *17/00;* **C01F** *1/00, 3/00*

U.S. Cl. 423—242 **6 Claims**

1. A process for removing sulfur dioxide from effluent oxidation product gas and for recovering amphoteric components from solid inorganic combustion byproducts of coal combustion of a coal burning power generating facility comprising the steps of

leaching said solid inorganic combustion byproducts with an aqueous caustic leachant solution having a pH of at least about 12 to provide an alkali solubilized salt solution comprising alkali-solubilized amphoteric combustion byproduct components selected from the group consisting of alkali aluminates as an absorber solution,

contacting said effluent gas with said absorber solution at a solution temperature in the range of from about 60° to about 90° centigrade while maintaining the pH of said absorber solution in the range of from about 12 to about 6 to remove sulfur dioxide from the effluent gas and to produce a precipitate of said amphoteric inorganic combustion byproduct components and an alkali sulfite salt solution.

recovering said precipitate by separating said precipitate from said alkali sulfite salt solution,

acidifying the alkali sulfite salt solution after separation of said amphoteric inorganic combustion byproduct precipitate to recover sulfur dioxide from said solution, and to produce an alkali salt solution,

electrolytically recovering an aqueous caustic leachant solution from said alkali salt solution, and

recycling said caustic leachant to leach solid inorganic amphoteric combustion byproducts from said power generation facility to provide an alkali solubilized amphoteric salt absorber solution.

4,421,727

$NF_4^+WF_7^-$ AND $NF_4^+UF_7^-$ AND METHODS OF PREPARATION

William W. Wilson, Simi Valley, and Karl O. Christe, Calabasas, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 25, 1982, Ser. No. 392,100
Int. Cl.³ C01G 43/00, 41/00; C01B 21/083
U.S. Cl. 423—253 8 Claims

1. NF_4UF_7.

4,421,728

STABILIZATION OF RED PHOSPHORUS

Helena Twardowska, Mississauga, Canada, assignor to ERCO Industries Limited, Islington, Canada

Filed Jul. 7, 1982, Ser. No. 396,125
Int. Cl.³ C01B 25/01, 25/02, 25/04
U.S. Cl. 423—265 17 Claims

4. A process for producing red phosphorus stabilized against oxidation, which comprises:

forming a slurry of red phosphorus particles of particle size of at most about 2 mm,

heating said slurry to a temperature of about 60° to about 95° C.,

adding to the heated slurry a titanium compound in an amount to provide an oxidation stabilizing amount of titanium on the red phosphorus particles, said titanium compound being one whereby titanium dioxide or titanium phosphate precipitates in said slurry,

adjusting the pH of said slurry to a value of about 2 to 6 to effect precipitation of titanium dioxide or titanium phosphate on the red phosphorus particles,

separating the red phosphorus particles so treated from the slurry, and

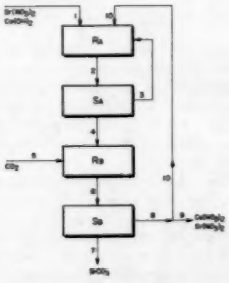
drying the separated treated particles to form a homogenous blend of red phosphorus particles and titanium dioxide or titanium phosphate.

4,421,729

PREPARATION OF STRONTIUM CARBONATE

John S. Chiang, Mercerville, and David Goldstein, East Brunswick, both of N.J., assignors to FMC Corporation, Philadelphia, Pa.

Filed Jan. 11, 1982, Ser. No. 338,829
Int. Cl.³ C01F 11/40, 5/24
U.S. Cl. 423—430 14 Claims



1. The process of preparing strontium carbonate which comprises

(a) reacting strontium nitrate in an aqueous reaction medium, that is concentrated with respect to strontium nitrate, with carbon dioxide to selectively precipitate strontium carbonate product;

(b) neutralizing nitric acid byproduct which forms during the reaction by introducing sufficient lime into the aqueous reaction medium to obtain a molar ratio of dissolved calcium to dissolved strontium therein at from 0.1:1 to about 7:1 Ca:Sr; and

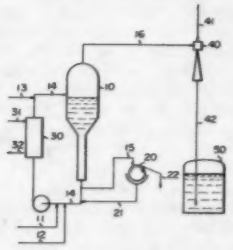
(c) recovering the solid strontium carbonate product substantially free of lime and calcium carbonate from the reaction medium.

4,421,730

PROCESS FOR MANUFACTURING HIGHLY PURE CHLORINE DIOXIDE

Isao Isa, Misatomachi; Hideo Yamamoto, Shibukawa; Syuki Shindo, Shibukawa, and Morioki Shibuya, Shibukawa, all of Japan, assignors to The Japan Carlit Co., Ltd., Tokyo, Japan

Filed Feb. 9, 1982, Ser. No. 347,257
Claims priority, application Japan, May 19, 1981, 56-75553
Int. Cl.³ C01B 11/02, 15/02
U.S. Cl. 423—478 6 Claims



1. A process for manufacturing highly pure chlorine dioxide by reducing an alkali metal chlorate selected from the group consisting of sodium chlorate and potassium chlorate with chloride ion, in a strong acidic reaction medium selected from the group consisting of sulfuric acid, hydrochloric acid and mixtures thereof in the presence of hydrogen peroxide and a complex catalyst palladium(II) with chloride ion, in a single generator-crystallizer at a temperature of 25° to 90° C. under a reduced pressure of 20 to 400 mmHg.

4,421,731

PROCESS FOR PURIFYING PHOSPHOGYPSUM

Jay W. Palmer, Tampa, Fla., and John C. Gaynor, Des Plaines, Ill., assignors to United States Gypsum Company, Chicago, Ill.

Filed Sep. 29, 1982, Ser. No. 427,377
The portion of the term of this patent subsequent to Jun. 14, 2000, has been disclaimed.
Int. Cl.³ C01F 11/46; C01G 56/00; C01B 25/16
U.S. Cl. 423—555 15 Claims

1. A process for reducing radioactivity of phosphogypsum containing radioactive contamination comprising the steps of

(A) thermally calcining phosphogypsum containing radioactivity in about 10–60 minutes at a temperature between about atmospheric and 60 psig to yield phosphohemihydrate containing radioactivity;

(B) slurrying the phosphohemihydrate with sufficient water and purified gypsum seed crystals that are substantially free of radioactivity to form an aqueous slurry of about 10–60 weight % calcium sulfate solids and about 1:9 to 9:1 weight proportion of phosphohemihydrate to purified gypsum seed crystal;

(C) hydrating at a temperature between about 55° and 90° C., in about 10–60 minutes, a substantial proportion but less than all, of the phosphohemihydrate to gypsum substantially free of radioactivity; and

(D) separating relatively larger gypsum particles substantially free of radioactivity from relatively smaller hemihydrate particles containing radioactive contamination.

4,421,732

PROCESS FOR DRY DESULFURIZATION OF FLUE GAS

Takeo Komuro; Kenichi Gomi; Norio Arashi, all of Hitachi; Hidetoshi Akimoto, Ibaraki; Yukio Hishinuma, Hitachi; Hajime Iinuma, Katsuta, and Osamu Kanda, Kure, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 16, 1981, Ser. No. 274,277
Claims priority, application Japan, Jun. 16, 1980, 55-80186
Int. Cl.[3] B01J 8/00; C01B 17/00, 17/02
U.S. Cl. 423—569 9 Claims

1. A process for dry desulfurization of flue gas, wherein sulfur oxides are removed from a flue gas produced by boilers or furnaces using coal as at least a part of the fuel, which comprises:

preparing a semi-coke adsorbent by dry distillation and activation of the fuel coal having particle sizes between about 5 and about 10 mm, said fuel coal sent to said dry distillation having at least one of an ash content lower than 15% by weight and a fixed carbon content of at least 50% by weight, said fuel coal sent to said dry distillation having a pH value smaller than 4.5 at an acidity test carried out under such conditions that (1) the coal is mixed with pure water at a coal/pure water weight ratio of ¼ and (2) the mixing and stirring time is about 5 hours and, after the resulting aqueous solution has been allowed to stand still for about 1 hour, the pH value of the aqueous solution is measured;

moving said semi-coke adsorbent, prepared by dry distillation of fuel coal having particle sizes between about 5 and about 10 mm, through a moving bed type desulfurization column from the top of the column downwards;

contacting the flue gas with the semi-coke adsorbent in the column to adsorb the sulfur oxides from the flue gas;

heating the sulfur oxides-adsorbed semi-coke adsorbent after it has moved through the column, thereby desorbing the sulfur oxides at a high concentration while simultaneously regenerating the semi-coke adsorbent;

recyclically using the regenerated semi-coke adsorbent; and

passing the desorbed sulfur oxides through a bed of dry distilled semi-coke heated to a high temperature, thereby converting the sulfur oxides to elemental sulfur.

4,421,733

METHOD OF REMOVING HYDROGEN SULFIDE FROM GASES UTILIZING A STABILIZED METAL CHELATE SOLUTION

George C. Blytas, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed May 24, 1982, Ser. No. 380,975
Int. Cl.[3] C01B 17/04; B01D 53/34
U.S. Cl. 423—573 R 8 Claims

1. A process for the removal of H_2S from a sour gaseous stream comprising:

(a) contacting the sour gaseous stream in a contacting zone with an aqueous reaction solution at a temperature below the melting point of sulfur, the solution containing an effective amount of a reactant selected from the group consisting of oxidizing polyvalent metal chelate compounds, and mixtures thereof, and a stabilizing amount of the bisulfite ion, and producing a sweet gas stream and an aqueous admixture containing crystalline sulfur and a reduced reactant;

(b) removing at least a portion of the crystalline sulfur from the aqueous admixture;

(c) regenerating the aqueous admixture in a regeneration zone to produce a regenerated reactant;

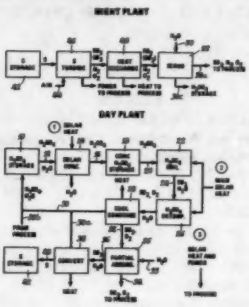
(d) returning aqueous admixture containing regenerated reactant from the regeneration zone to the contacting zone.

4,421,734

SULFURIC ACID-SULFUR HEAT STORAGE CYCLE

John H. Norman, LaJolla, Calif., assignor to GA Technologies Inc., San Diego, Calif.

Filed May 11, 1982, Ser. No. 377,124
Int. Cl.[3] C01B 1/16
U.S. Cl. 423—648 R 11 Claims



1. A cyclical method of storing energy intermittently collected from an external heat source and then supplying heat by using the stored energy to adjust the availability of the energy to energy requirements, the method comprising the steps of

(a) collecting heat from the external source,

(b) concentrating a dilute sulfuric acid solution to at least about 90 percent by weight,

(c) thermally decomposing said concentrated sulfuric acid solution using the energy collected from said external source to yield sulfur dioxide and oxygen,

(d) reacting sulfur dioxide with water at temperatures of between about 120° C. and about 180° C. at pressures of between about 50 psig and about 1500 psig to yield dilute sulfuric acid and elemental sulfur, said reaction of sulfur dioxide and water being carried out for a period of time sufficient to react at least about 85 percent of the sulfur dioxide,

(e) recycling the dilute sulfuric acid to an earlier step,

(f) storing said elemental sulfur,

(g) subsequently removing said stored sulfur from storage and oxidizing said elemental sulfur to retrieve the stored energy to fulfill the energy requirements and producing sulfur dioxide, and

(h) recycling the sulfur dioxide resulting from said oxidation to step d.

10. A method of providing energy collected intermittently from an external heat source to a water-splitting chemical process including the Bunsen reaction, the method comprising

collecting thermal energy from the external heat source,

fulfilling the thermal energy requirements of said water-splitting process with collected energy during periods when the collected energy is sufficient,

storing collected thermal energy in excess of that required by said chemical process in a heat storage process, and

recovering stored energy to fulfill the energy requirements of said water-splitting process during periods when said collected thermal energy is insufficient for the requirements of the water-splitting process,

the heat storage and recovery process comprising the steps of

(a) concentrating a dilute sulfuric acid solution to at least about 90 weight percent with said collected thermal energy,

(b) thermally decomposing said concentrated sulfuric acid solution using said collected thermal energy to yield sulfur dioxide and oxygen,

(c) reacting a portion of said sulfur dioxide with water to yield dilute sulfuric acid and elemental sulfur,

(d) providing a portion of said sulfur dioxide to said water-splitting process, said water-splitting process producing sulfuric acid,
(e) returning the sulfuric acid produced in said water-splitting process to step a,
(f) storing said elemental sulfur created by said reaction,
(g) subsequently removing said stored elemental sulfur from storage and oxidizing said elemental sulfur to retrieve its stored energy, thereby producing sulfur dioxide, and
(h) utilizing at least a substantial portion of the sulfur dioxide produced by said combustion in said water-splitting process.

4,421,735

RADIOLABELED DIAGNOSTIC COMPOSITIONS AND METHOD FOR MAKING THE SAME

Edgar Haber, Weston, and Ban A. Khaw, Milton, both of Mass., assignors to The Massachusetts General Hospital, Boston, Mass.

Filed Apr. 17, 1980, Ser. No. 141,053
Int. Cl.³ A61K *43/00, 49/00;* C07G *7/00*
U.S. Cl. 424—1.1 14 Claims

1. A composition comprising a protein covalently bonded to a bifunctional physiologically acceptable chelating agent and technetium-99m being bound to said chelating agent, said technetium-99m being reduced with dithionite and mixing said technetium-99m with said protein covalently linked to said chelating agent at a pH of at least about 7.0 up to about 9.0.

4,421,736

SUSTAINED RELEASE DIETHYLPROPION COMPOSITIONS

Eugene L. Walters, Cincinnati, Ohio, assignor to Merrel Dow Pharmaceuticals Inc., Cincinnati, Ohio

Filed May 20, 1982, Ser. No. 379,848
Int. Cl.³ A61K *9/52, 9/56, 9/62*
U.S. Cl. 424—19 6 Claims

1. A sustained release pharmaceutical composition which comprises a capsule filled with granules of a wax matrix surrounded by a hydrophilic gum wherein the wax matrix consists essentially of 3 parts by weight of diethylpropion hydrochloride embedded in a mixture of 1 part by weight of hydrogenated castor oil and 3 parts by weight of paraffin, and wherein the surrounding hydrophilic gum consists essentially of from 4 to 5 parts by weight of a hydroxypropyl methylcellulose and from 1 to 1.5 parts by weight of tartaric acid.

4,421,737

PRESSURE-SENSITIVE ADHESIVE TAPE OR PRESSURE-SENSITIVE ADHESIVE SHEET CONTAINING NITROGLYCERIN

Toshio Ito, Sekimachi; Hiroshi Ninomiya, Sayama, and Kunio Yamagami, Naruto, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha; Taibo Pharmaceutical Company Limited and Nichiban Co. Ltd., all of Tokyo, Japan

Filed Mar. 25, 1981, Ser. No. 247,307
Int. Cl.³ A61F *13/02;* C09J *7/02*
U.S. Cl. 424—28 10 Claims

1. Pressure-sensitive adhesive tape or sheet containing nitroglycerin comprising a nitroglycerin-impermeable backing coated with pressure-sensitive adhesives comprising:
(1) 100 parts by weight of rubber base adhesive basis selected from the group consisting of natural rubber, synthetic isoprene rubber, isobutylene rubber, styrene-butadiene rubber, styrene-isoprene thermoplastic rubber, a mixture of natural rubber and isobutylene rubber, a mixture of natural rubber and styrene-isoprene thermoplastic rubber, and a mixture of synthetic isoprene rubber and kaolin clay,
(2) 20 to 200 parts by weight of at least one kind of tackifier selected from the group consisting of tackifiers with polar groups and those without polar groups,
(3) 0 to 50 parts by weight of at least one kind of softener selected from the group consisting of softners with polar groups and those without polar groups,
(4) the total amount of the tackifiers with polar groups and the softeners with polar groups being 3 to 200 parts by weight, and
(5) 1 to 10% by weight of nitroglycerin to the whole amount of the adhesives.

4,421,738

SUGAR-COATED TABLET CONTAINING FAT-SOLUBLE PHARMACEUTICAL MATERIAL

Satoshi Yamagiwa, Isezaki, Japan; Yoshio Taguchi, Takao, China, and Masanori Kayano, Honjo, Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 169,325, Jul. 16, 1980, abandoned. This application Mar. 18, 1982, Ser. No. 359,407
Claims priority, application Japan, Jul. 31, 1979, 54-96677
Int. Cl.³ A61K *9/36*
U.S. Cl. 424—35 8 Claims

1. A sugar-coated tablet, comprising: a core containing low-melting, fat-soluble, active pharmaceutical material; a continuous coating film formed in direct contact with and completely covering said core, said coating film consisting of a material selected from the group consisting of (a) a pharmacologically acceptable water-soluble cellulose ether, (b) a mixture of two or more of said cellulose ethers and (c) a mixture of one or more of said cellulose ethers and a plasticizer therefor, said coating film being free of sugar; and a pharmacologically acceptable, sugar, coating layer over said film, said sugar layer being free of water-soluble cellulose ether, said film being effective to prevent migration of said active pharmaceutical material from said core to said sugar coating layer.

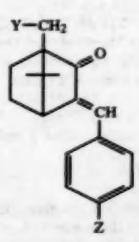
4,421,739

BENZYLIDENE-CAMPHORS, PROCESSES FOR THEIR PREPARATION AND COSMETIC COMPOSITIONS CONTAINING THEM

Claude Bouillon, Eaubonne, and Charles Vaysse, Aulnay-sous-Bois, both of France, assignors to L'Oreal, Paris, France

Filed Mar. 14, 1978, Ser. No. 886,560
Claims priority, application France, Mar. 15, 1977, 77 07720; Sep. 9, 1977, 77 27343
Int. Cl.³ C07C *49/433;* A61K *7/42;* C07C *49/627*
U.S. Cl. 424—47 51 Claims

1. A compound having the general formula:



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in which Y denotes hydrogen or the radical SO_3H or a salt thereof with an organic or inorganic base, and Z denotes the radical $—CH_2Br$ or —CHBrBr or a radical Z′ which denotes the radical $—CH_2I$, $—CH_2R$, —CHR′R′, —CHO or —COOR″, in which R denotes $—NR_1R_2$, $—N^+R_1R_2R_3$, —OR4, RO-COR5, —SR6, —CN, —COOR″ or $—SSO_2Na$, in which R_1 and R_2 independently denote hydrogen, C_{1-18} alkyl or hydroxyalkyl, or R_1 and R_2 together with the nitrogen atom to which they are attached, denote a heterocyclic ring, R_3 denotes C_{1-4} alkyl or hydroxyalkyl or sulphonatopropyl, R_4 denotes hydrogen, alkyl, polyoxyethylene, aryl which is optionally substituted, menthyl or dialkylaminoalkyl, R_5 denotes alkyl, alkenyl, aryl or a 5 or 6 membered heterocyclic ring which is optionally

aromatic, and R_6 denotes hydrogen, alkyl, carboxyalkyl, aminoalkyl, hydroxyalkyl, aryl or 3-alanyl, R' R' denotes —OR'4 or —SR'6 in which R'4 and R'6 are as defined under R_4 and R_6 respectively, except for hydrogen, polyoxyethylene, hydroxyalkyl, 3-alanyl and aryl, and R'' denotes hydrogen or alkyl, such that when R denotes $N^+R_1R_2R_3$, R_1 and R_2 are not hydrogen and either R_3 denotes sulphonatopropyl, or the compound is in the form of a salt with an anion, which is SO_4alkyl, SO_3aryl, SO_3alkyl or halogen or an inorganic or organic acid addition salt thereof when R denotes $—NR_1R_2$

4,421,740

HAIR CONDITIONING COMPOSITION AND PROCESS FOR PRODUCING THE SAME

Colin K. Burton, Racine, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.

Continuation of Ser. No. 860,019, Dec. 12, 1977, abandoned, and Ser. No. 704,000, Jul. 9, 1976, abandoned. This application Jan. 15, 1979, Ser. No. 3,678

Int. Cl.³ A61K *7/06, 47/00*

U.S. Cl. 424—70 **3 Claims**

1. A process for preparing a stable hair conditioning composition consisting essentially of from about 0.5 to 2% by weight of a conditioning compound selected from the group consisting of stearyl dimethyl benzyl ammonium chloride, dihydrogenated tallow dimethyl ammonium chloride, mixed C12-C18 alkyl trimethyl ammonium chloride, cetyl dimethyl amine oxide, stearyl dimethyl amine oxide, and mixtures thereof; from about 0.5 to 2% by weight cetyl alcohol; from about 0.1 to about 10% by weight of a protective colloid selected from the group consisting of methyl cellulose, ethyl cellulose, hydroxyethyl cellulose, guar gum, and mixtures thereof; and 86–99% by weight water, the conditioning compound and cetyl alcohol being present in a ratio of from about 1.5:1 to 0.42:1 which comprises

(a) combining the conditioning compound, water, and cetyl alcohol at a temperature above 50° C. to form an intermediate;

(b) cooling the intermediate to a temperature within the range of from 80°–120° F.;

(c) homogenizing the intermediate at a pressure of from 500–8,000 psi;

(d) dispensing the protective colloid in water; and

(e) blending the intermediate and dispersed protective colloid.

4,421,741

PHARMACEUTICAL COMPOSITIONS

David J. Gilbert, Bishops Stortford, and Derek A. Hollingsbee, Chelmsford, both of England, assignors to Smith and Nephew Associated Companies Limited, England

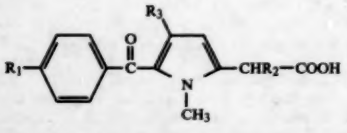
Division of Ser. No. 253,184, Apr. 13, 1981, Pat. No. 4,349,563. This application Jun. 9, 1982, Ser. No. 386,745

Claims priority, application United Kingdom, Apr. 18, 1980, 8012853

Int. Cl.³ A61K *31/40, 31/70, 31/71, 37/00*

U.S. Cl. 424—104 **104 Claims**

1. A method of treating ocular inflamation which comprises topically administering to the eye an anti-inflammatory amount of a composition which comprises an anti-inflammatory effective amount of a compound of the formula (I):



or a pharmaceutically acceptable salt thereof wherein R_1 is chloro or methyl; R_2 is hydrogen or methyl; and R_3 is hydrogen or methyl, and an antibacterially effective amount of an aminoglycoside selected from the group consisting of neomycin, gentamycin, framycetin, polymixin B, tobramycin, kanamycin, vancomycin and amikacin or a pharmaceutically acceptable salt thereof, in combination with an ocularly acceptable carrier.

4,421,742

PHOSPHINE PRODUCING PESTICIDE AND METHOD OF MANUFACTURE THEREFOR

Wolfgang F. R. Friemel, Heppenheim, and Werner O. Praxl, Rimbach, both of Fed. Rep. of Germany, assignors to Dr. Werner Freyberg Chemische Fabrik Delitia Nachf., Laudenbach, Fed. Rep. of Germany

Continuation of Ser. No. 964,410, Nov. 28, 1978, abandoned, which is a continuation-in-part of Ser. No. 850,341, Nov. 19, 1977, abandoned. This application Mar. 4, 1981, Ser. No. 240,447

Claims priority, application Fed. Rep. of Germany, Feb. 8, 1977, 2705228; South Africa, Dec. 5, 1977, 77/7233

Int. Cl.³ A01N *55/00, 59/26*

U.S. Cl. 424—128 **43 Claims**

1. In a phosphine producing pesticide composition comprising a mixture of a pesticidally effective amount of particles of a hydrolyzable metal phosphide and particles of a self-ignition inhibitor in an amount effective to protect the composition against spontaneous combustion of phosphine released from the composition, and which is hydrophobized so as to render the composition sufficiently repellant to liquid water to reduce the likelihood of spontaneous combustion upon contact therewith, the improvement wherein the composition is hydrophobized by a silicon-organic compound chemically bonded to the surface of at least the particles of the metal phosphide and present in an amount from about 0.1% to about 3% by weight of the pesticide composition.

4,421,743

ANTIHYPERTENSION TREATMENT

Jose A. A. Alvarez, Carpatos, Mexico, assignor to T & R Chemicals, Inc., Clint, Tex.

Continuation-in-part of Ser. No. 75,423, Sep. 14, 1979, Pat. No. 4,327,083, which is a continuation-in-part of Ser. No. 859,705, Dec. 12, 1977, abandoned. This application Jan. 5, 1982, Ser. No. 337,177

The portion of the term of this patent subsequent to Apr. 27, 1999, has been disclaimed.

Int. Cl.³ A61K *33/04*

U.S. Cl. 424—162 **4 Claims**

1. A method of treating hypertension in a human suffering from said condition comprising introducing into said human an antihypertensively effective amount of a compound selected from the group consisting of alkali metal, alkaline earth metals and ammonium sulfites and bisulfites, and alkali metal metabisulfites at a pharmaceutically effective rate of from about 0.2 to 50.0 mgm thereof per kilogram of body weight per 24 hours.

4,421,744

AMINOACYL DERIVATIVES

James J. Gormley, Holmes Chapel, United Kingdom, assignor to Imperial Chemical Industries PLC, London, England

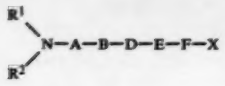
Filed May 18, 1982, Ser. No. 379,614

Claims priority, application United Kingdom, Jun. 22, 1981, 8119163

Int. Cl.³ A61K *37/00;* **C07C** *103/52*

U.S. Cl. 424—177 **9 Claims**

1. A compound of the formula:



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wherein:

R^1 stands for an alk-2-enyl, haloalk-2-enyl or alk-2-ynyl radical of not more than 5 carbon atoms, or a furylmethyl or tetrahydrofurylmethyl radical;

R^2 stands for an alk-2-enyl, haloalk-2-enyl, alk-2-ynyl or alkyl radical of not more than 5 carbon atoms, a phenylalkyl radical of not more than 10 carbon atoms, or a furylmethyl or tetrahyrofurylmethyl radical;

or R^1 and R^2 are joined to form, together with the adjacent nitrogen atom, a morpholino, piperidino, methylpiperidino or 1-aza-3,6-methancycloheptan-1-yl radical;

>N-A stands for the residue of D-, L-, D,L- or aza-tyrosine, phenylalanine or p-aminophenylalanine;

B stands for a single valency bond or for the residue of D-, L- or D,L-, where the amino acid contains a chiral centre, or aza-, glycine, methionine, alanine, serine or sarcosine;

D stands for a single valency bond or for the residue of D-, L- or D,L-, where the amino acid contains a chiral centre, or aza-, glycine, alanine, phenylalanine, sarcosine, serine, O-benzylserine, cysteine or S-benzylcysteine;

E stands for a single valency bond or for the residue of D-,L- or D,L-, where the amino acid contains a chiral centre, or aza-, glycine, phenylalanine, N-methylphenylalanine, p-nitrophenylalanine, p-chlorophenylalanine or tryptophan;

F stands for the residue of D-,L- or D,L-, where the amino acid contains a chiral centre, or aza-, glycine, leucine, methionine, alanine, phenylalanine, proline, serine, O-benzylserine or norlecuine, or a dipeptide residue which is D-,L-, D,L- or aza-, leucine-arginine, leucine-glutamic acid, leucine-leucine, leucine-phenylalanine or leucine-threonine; and

X stands for a group of the formula $—CO_2R^3$ or $—CONHR^4$, wherein R^3 stands for hydrogen or an alkyl or alkenyl radical of not more than 4 carbon atoms, and R^4 stands for hydrogen, an alkyl, hydroxyalkyl, cycloalkyl or alkoxycarbonylalkyl radical of not more than 6 carbon atoms, a phenylalkyl or phenyl(hydroxy)alkyl radical of not more than 9 carbon atoms, or a phenyl, phenylcyclopropyl, 2-benzylthioethyl, 2-(2-phenylethylthio)ethyl or indanyl radical;

and wherein the linkages between the amino acid residues are peptide linkages or at least one of said linkages is a pseudo linkage selected from $—CH_2S—$, —NHCO—, —CO.NH.O—, trans-CH=CH— and $—CH_2CH_2—$;

or a pharmaceutically-acceptable salt thereof.

4,421,745

ANTIEPILEPTICS

Kazutoyo Inanaga, Kurume, and Yugi Nagawa, Nagaokakyo, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

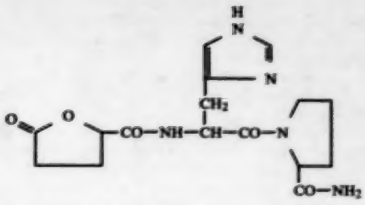
Filed Sep. 10, 1982, Ser. No. 416,706

Claims priority, application Japan, Sep. 16, 1981, 56-146946

Int. Cl.³ A61K *37/00*

U.S. Cl. 424—177 **5 Claims**

1. A method for the treatment of an epileptic patient, which comprises administering to said patient an effective amount of a peptide of the formula:



or a physiologically acceptable salt thereof.

4,421,746

PROCESS FOR PRODUCING INTERFERON INDUCERS

Yasuhiko Kojima, Yokohama; Sadao Tamamura; Seishi Konno, both of Tokyo, and Takashi Hashimoto, Chofu, all of Japan, assignors to The Kitasato Institute, Tokyo, Japan

Continuation-in-part of Ser. No. 212,065, Dec. 2, 1980, abandoned. This application Jun. 28, 1982, Ser. No. 392,994

Claims priority, application Japan, Dec. 3, 1979, 54-155627; Dec. 27, 1979, 54-170642

Int. Cl.³ A61K *35/78*

U.S. Cl. 424—195 **27 Claims**

1. A process for producing water-soluble interferon inducer, which comprises extracting with water the tissue of a plant belonging to the Gourd family and selected from the genera group consisting of Benincasa, Cucurbita, Citrullus, Cucumis, Lagenaria, Luffa, Mormordica, Tricosanthes and their variants capable of producing the said interferon inducer, at a temperature of from ambient to the boiling point of the extraction mixture, conducting the extraction for a period sufficient to extract the major portion of the said interferon inducer present in the said tissue, forming a supernatant from the extracted solution thus obtained, fractionating the supernatant to yield fractions containing the major portion of the said interferon inducer present in the supernatant, and recovering said interferon inducer therefrom.

4,421,747

INFLAMMATION-PREVENTING PHARMACEUTICAL COMPOSITION OF ORAL ADMINISTRATION

Miklos Ghyczy; Adorjan Erdös, both of Cologne, and Günter Heidemann, Geilenkirchen-Tripsrath, all of Fed. Rep. of Germany, assignors to A. Nattermann & Cie. GmbH, Fed. Rep. of Germany

Division of Ser. No. 104,449, Dec. 17, 1979, Pat. No. 4,332,795. This application May 22, 1981, Ser. No. 266,216

Int. Cl.³ A61K *31/685*

U.S. Cl. 424—199 **24 Claims**

1. A method of alleviating inflammation in a mammal comprising orally administering to said mammal an effective inflammation-alleviating amount of a pharmaceutical composition comprising at least one phospholipid and a non-steroidal inflammation-preventing phenylacetic or phenylpropionic acid derivative selected from the group consisting of ibuprofen, naproxen, alclofenac, ketoprofen, diclofenac, fenoprofen, tolmetin, flurbiprofen and suprofen, said phospholipid and said compound being present in a molar ratio ranging from about 0.1:1 to about 20:1, respectively.

4,421,748
ARTIFICIAL TEAR AID

Seymour F. Trager, 14 Sherwood Dr., Plainview, N.Y. 11803, and Victoria S. Chylinski, 11 Peghouse Rise, Slad Road, Stroud, Glos., England

Filed Jul. 13, 1982, Ser. No. 397,914
Int. Cl.³ A61K 31/685, 31/74
U.S. Cl. 424—199 7 Claims

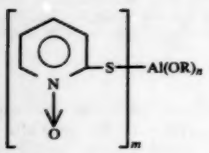
1. An artificial tear composition comprising a sterile hypotonic aqueous solution containing from about 1.0 to 20 percent weight/volume lecithin and from about 0.1 to about 20 percent by weight of a viscosity-adjusting agent selected from the group consisting of methyl cellulose, hydroxypropyl cellulose, polyvinyl alcohol and hydroxyethyl cellulose.

4,421,749
ALUMINUM PYRIDINETHIOLS AS ANTIMICROBIALS

Horst Pauling, Bottmingen, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Jun. 26, 1981, Ser. No. 277,781
Claims priority, application Switzerland, Jul. 2, 1980, 5112/80
Int. Cl.³ A61K 31/555; C07D 213/89
U.S. Cl. 424—200 18 Claims

1. A compound of the formula



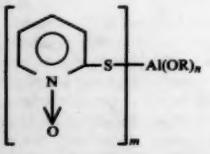
I

wherein
m is 1 or 2,
n is 1 or 2,
whereby the sum m+n is 3, and
R is ethyl or n-hexadecyl; straight-chain or branched C_{1-4}-alkyl monosubstituted with phenoxy; 2,4-hexadienoyl; unsubstituted phenyl or phenyl substituted with 1 to 5 chlorine atoms or a phenyl group; or a group of the formula

(a)

wherein
R^1 is C_{1-6}-alkyl, or,
where m is 1 and n is 2, the two R-symbols together form a 2,2'-methylene-bis-(3,4,6-trichloro-o-phenylene)group, or,
where m is 2 and n is 1, R is a 2,4,5-trichloro-6-[2,3,5-trichloro-6-[di(2-pyridinethiolato)aluminum]oxy-benzyl]-phenyl N,N'-dioxide group.

9. An antimicrobial cosmetic composition, comprising a cosmetic base and an antimicrobially-effective amount of at least one compound of the formula



I

wherein
m is 1 or 2,
n is 1 or 2,
whereby the sum m+n is 3, and
R is ethyl or n-hexadecyl; straight-chain or branched C_{1-4}-alkyl monosubstituted with phenoxy; 2,4-hexadienoyl; unsubstituted phenyl or phenyl substituted with 1 to 5 chlorine atoms or a phenyl group; or a group of the formula

(a)

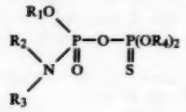
wherein
R^1 is C_{1-6}-alkyl, or,
where m is 1 and n is 2, the two R-symbols together form a 2,2'-methylene-bis(3,4,6-trichloro-o-phenylene) group, or,
where m is 2 and n is 1, R is a 2,4,5-trichloro-6-[2,3,5-trichloro-6-[di(2-pyridinethiolato)aluminum]oxy-benzyl]-phenyl N,N'-dioxide group.

4,421,750
ORGANOPHOSPHORIC ACID ESTER ANHYDRIDES AS PESTICIDES

Hiromichi Ishikawa; Kazuhiko Kitaori, both of Atsugi; Kimiyoshi Kaneko, Isehara; Satoru Moriyama, Ebina; Takashi Kobayashi, and Tsugio Uchiyama, both of Atsugi, all of Japan, assignors to Hokko Chemical Industry Co., Ltd., Nihonbashi, Japan

Filed Mar. 2, 1982, Ser. No. 353,927
Claims priority, application Japan, Mar. 9, 1981, 56-33295
Int. Cl.³ A01N 57/12; C07F 9/24
U.S. Cl. 424—207 7 Claims

1. The compound of the formula



(I)

wherein R_1 is a lower alkyl group containing 3 or more carbon atoms and R_2, R_3 and R_4 may be the same or different from each other and each are a lower alkyl group.

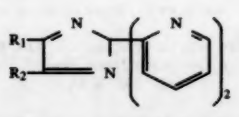
2. A method of combating insect pests, acarine pests and/or nematode pests at a locus of infestation, which comprises treating the pests or the locus of infestation with an insecticidally, miticidally and/or nematocidally effective amount of the compound as claimed in claim 1.

4,421,751
BIPYRIDINE SUBSTITUTED IMIDAZOYLIDENE, COPPER COMPLEX, AND ITS USE IN FOOD-PRODUCING ANIMALS

Kurt G. R. Sundelin, Modesto, Calif., assignor to International Minerals & Chemical Corp., Terre Haute, Ind.

Filed Apr. 1, 1982, Ser. No. 364,369
Int. Cl.³ A61K 31/555, 31/44; C07D 401/00; C07F 15/00
U.S. Cl. 424—245 11 Claims

1. A compound of the formula



wherein R_1 and R_2 are hydrogen, alkyl or phenyl, and including the cuprous, ferrous and nickelous salts thereof.

5. A growth promoting animal feed additive comprising a compound of claim 1, claim 2, claim 3 or claim 4 in an amount effective to promote animal growth.

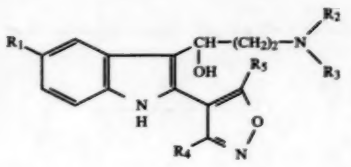
4,421,752

ISOXAZOLYL INDOLAMINES AS HYPOGLYCEMICS

Leonard J. Brand, Randolph, and Jeffrey Nadelson, Denville, both of N.J., assignors to Sandoz, Inc., E. Hanover, N.J.

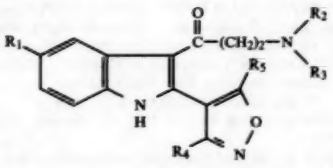
Division of Ser. No. 251,068, Apr. 6, 1981, Pat. No. 4,336,391. This application Mar. 19, 1982, Ser. No. 359,752
Int. Cl.³ C07D *413/04, 413/14;* A61K *31/42*
U.S. Cl. 424—248.4 19 Claims

1. A pharmaceutical composition useful in treating diabetes as a hypoglycemic agent comprising a compound of the formula:



(I)

or of the formula



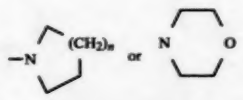
(II)

wherein

R_1 represents hydrogen, fluoro, chloro, lower alkyl having 1 to 4 carbon atoms, or lower alkoxy having 1 to 4 carbon atoms,

R_2 and R_3 each independently represent lower alkyl having 1 to 4 carbon atoms, or

R_2 and R_3 together with N represent



wherein

n is 1, 2 or 3, and

R_4 and R_5 each independently represent hydrogen or lower alkyl having 1 to 4 carbon atoms,

or a pharmaceutically acceptable acid addition salt thereof in association with a pharmaceutical carrier or diluent, said compound being present in an amount sufficient to provide a daily dose of 70 to 1000 milligrams of compound.

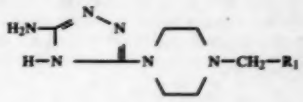
4,421,753

1-(5-AMINO-4H-1,2,4-TRIAZOL-3-YL)-4-SUBSTITUTED-PIPERAZINES

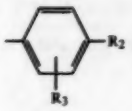
Andrew S. Tomcufcik, Old Tappan, N.J.; Walter E. Meyer, Suffern, and John P. Dusza, Nanuet, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 339,361, Jan. 15, 1982, abandoned. This application Mar. 22, 1982, Ser. No. 360,864
Int. Cl.³ C07D *417/14;* A61K *31/50*
U.S. Cl. 424—250 30 Claims

1. A compound selected from the group consisting of those of the formula:



wherein R_1 is selected from the group consisting of alkyl having up to 3 carbon atoms, cycloalkyl having from 3 to 6 carbon atoms, allyl, benzyl, β-phenethyl, β-phenoxyethyl, 3,4,5-trimethoxyphenyl, 2-furyl, 2-quinolyl, 2-phenyl-2H-1,2,3-triazol-4-yl and a moiety of the formula:



wherein R_2 is hydrogen, alkyl having up to 4 carbon atoms, fluoro, chloro, bromo, cyano, amino or dimethylamino and R_3 is hydrogen, methyl, fluoro, chloro, bromo or nitro; and the pharmacologically acceptable acid-addition salts thereof.

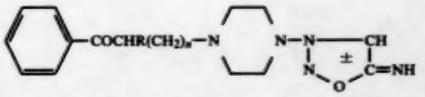
4,421,754

SYNDONIMINE DERIVATIVES, PROCESS FOR PRODUCTION THEREOF, AND USE THEREOF

Hiroyoshi Hidaka, 766-38, Kannonji-cho, Tsu-shi, Mie-ken, Japan; Ikuo Matsumoto, Tokyo, Japan; Junji Yoshizawa, Machida, Japan, and Shigenori Kotani, Kodaira, Japan, assignors to Hiroyoshi Hidaka, Mie, Japan

Filed Jul. 29, 1982, Ser. No. 402,974
Claims priority, application Japan, Aug. 24, 1981, 56-131564
Int. Cl.³ C07D *413/04;* A61K *31/495*
U.S. Cl. 424—250 8 Claims

1. A 3-[4-(benzoylalkyl)piperazine-1-yl]sydnonimine compound rej .esented by the following formula (I)



(I)

wherein R represents a hydrogen atom or an alkyl group having 1 to 8 carbon atoms, and n represents zero or an integer of 1 to 10,

and its acid addition salt.

4,421,755

METHOD OF TREATING CORONARY HEART DISEASE WITH IMIDAZO(4,5-B)PYRIDINES

Lothar Benedikter, and Eberhard Kutter, both of Biberach, Fed. Rep. of Germany, assignors to Dr. Karl Thomae Gesellschaft mit beschränkter Haftung, Biberach an der Riss, Fed. Rep. of Germany

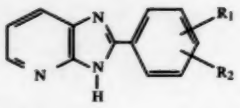
Filed Feb. 18, 1982, Ser. No. 349,838

Claims priority, application Fed. Rep. of Germany, Mar. 3, 1981, 3108027

Int. Cl.³ A61K *31/435, 31/44*

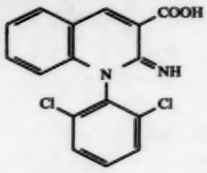
U.S. Cl. 424—256 3 Claims

1. The method of treating angina pectoris, coronary insufficiency or cardiac infarct in a warm-blooded animal in need thereof which comprises perorally, parenterally or rectally administering to said animal an effective coronary dilating and peripheral vasodilating amount of a compound of the formula



wherein R_1 is alkoxy of 1 to 4 carbon atoms, and

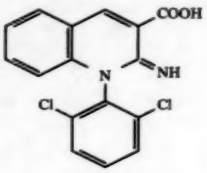
R_2 is (alkyl of 1 to 4 carbon atoms) sulfinyl, or non-toxic, pharmacologically acceptable acid addition salt thereof.



(I)

and pharmacologically acceptable salts thereof.

2. An anti-inflammatory and analgesic composition wherein a pharmaceutically effective amount of 1-(2,6-dichlorophenyl)-2-quinolinoneimine-3-carboxylic acid represented by the formula (I):



(I)

or a pharmaceutically acceptable salt thereof is contained as an effective ingredient.

4,421,756

QUINOLINONEIMINE CARBOXYLIC ACID ANTI-INFLAMMATORY AND ANALGESIC COMPOSITION CONTAINING THE COMPOUND

Tatsuo Shinohara; Yukihiro Oguri; Yukio Fujimori, and Hiroyuki Kondo, all of Toyama, Japan, assignors to Daito Koeki Kabushiki Kaisha, Toyama, Japan

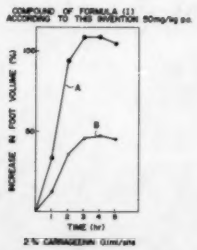
PCT No. PCT/JP80/00243, § 371 Date Aug. 18, 1981, § 102(e) Date Aug. 18, 1981, PCT Pub. No. WO81/01001, PCT Pub. Date Apr. 16, 1981

PCT Filed Oct. 9, 1980, Ser. No. 296,262

Claims priority, application Japan, Oct. 12, 1979, 54-132105

Int. Cl.³ A61K *31/47;* C07D *215/54*

U.S. Cl. 424—258 2 Claims



1. 1-(2,6-dichlorophenyl)-2-quinolinoneimine-3-carboxylic acid represented by the formula (I):

4,421,757

THIAZOLINE DERIVATIVES, PROCESSES FOR THEIR PREPARATION, THEIR USE AND PHARMACEUTICAL PREPARATIONS BASED ON THESE COMPOUNDS

Hans-Jochen Lang, Hofheim an Taunus; Bernhard Seuring, Frankfurt am Main, and Ernold Granzer, Kelkheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Dec. 28, 1981, Ser. No. 335,149

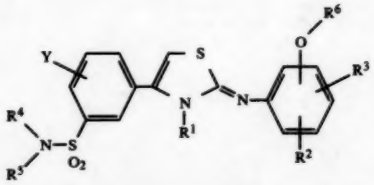
Claims priority, application Fed. Rep. of Germany, Dec. 30, 1980, 3049460

The portion of the term of this patent subsequent to Aug. 24, 1999, has been disclaimed.

Int. Cl.³ C07D *277/38;* A61K *31/425*

U.S. Cl. 424—270 9 Claims

1. A thiazoline derivative of the formula



or a physiologically tolerated salt thereof, in which R^1 is alkyl with 1 to 3 C atoms, R^2 and R^3 are hydrogen, halogen, alkyl or alkoxy with 1 to 4 C atoms, and are identical or different, R^4 and R^5 are hydrogen or alkyl with 1 to 4 C atoms, and are identical or different or together with the N atom form a saturated ring with up to 6 ring members, R^6 is hydrogen or an aliphatic acyl group with 1 to 4 C atoms and Y is hydrogen, halogen, or methyl.

4,421,758
ANTI-MICROBIAL DIAZOLE DERIVATIVES

Isao Kawamoto, and Masaki Nakahara, both of Hiromachi, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

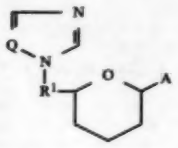
Filed Dec. 11, 1981, Ser. No. 329,995

Claims priority, application Japan, Dec. 12, 1980, 55-175525; Feb. 3, 1981, 56-14771

Int. Cl.³ A01N *43/50*; A61K *31/415*; C07D *405/06*

U.S. Cl. 424—273 R **24 Claims**

17. An antimicrobial composition comprising an antimicrobial effective amount of an antimicrobial agent and a carrier or diluent, wherein the antimicrobial agent is selected from a compound of formula (I):



(I)

wherein:

Q represents a =CH— group;

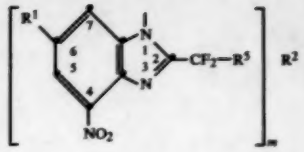
R^1 is methylene; and

A is $—OR^2$

wherein R^2 represents a C_1–C_6 alkyl group; a C_2–C_6 alkenyl group; a C_2–C_6 alkynyl group; a phenyl group; a phenyl group substituted with up to three halogen atoms, a C_1–C_6 alkyl group or a C_1–C_6 alkoxy group;

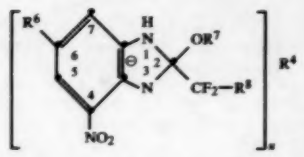
or a group of formula

in which R^5 represents a hydrogen atom; a C_1–C_6 alkyl group; a pheny group; a phenyl group substituted with up to two halogen atoms, a C_1–C_6 alkyl group or a C_1–C_6 alkoxy group; a thienyl group; a thienyl group substituted with a halogen atom; a furyl group; or a furyl group substituted with a halogen atom; R^6 represents a phenyl group; a phenyl group substituted with up to three halogen atoms, a C_1–C_6 alkyl group, a C_1–C_6 alkoxy group, a nitro group, a phenoxy group, or a phenyl group; a benzyl group; a benzyl group substituted on the benzene ring with up to two halogen atoms, a C_1–C_6 alkyl group, or a C_1–C_6 alkoxy group; a thienyl group; a thienyl group substituted with a halogen atom; a furyl group; or a furyl group substituted with a halogen atom; or an acid addition salt or the cupric chloride, zinc chloride or stannous chloride complex thereof.



I

and



II

wherein R^1–R^8 and m and n have the following meanings:

R^1=halo, CF_3, CF_2H, or CF_2Cl;

R^2=H, $COOR^3$, or R^4;

R^3=alkyl of C_1–C_8, alkenyl of C_3–C_4, or benzyl;

R^4=sodium, potassium, lithium, silver, magnesium, calcium, barium, strontium, ammonium, or substituted ammonium derived from an organic amine which is as basic as, or more basic than, ammonia;

R^5=H, Cl, F, CF_2H, or CF_3;

R^6=Br, Cl, or CF_3;

R^7=H or lower alkyl of C_1–C_4;

R^8=H, F, CF_2H, or CF_3;

m=when R^2=H or $COOR^3$, 1, and when R^2=R^4, the valence of R^4; and

n=the valence of R^4.

4,421,759
METHODS FOR CONTROLLING FIRE ANTS

Rudolph J. Boisvenue, Greenfield, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Jul. 27, 1981, Ser. No. 286,728

Int. Cl.³ A01N *43/50, 43/56*

U.S. Cl. 424—273 R **15 Claims**

1. Method for eradicating a red imported fire ant colony, which comprises supplying to the colony an effective amount of an active agent which is selected from the class consisting of compounds of the formulae

4,421,760
β-LACTAM ANTIBIOTIC, ITS PREPARATION AND USE

Stephen J. Box, Horsham, England, assignor to Beecham Group Limited, England

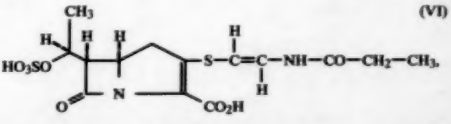
Filed Jun. 17, 1981, Ser. No. 274,464

Claims priority, application United Kingdom, Jul. 2, 1980, 8021730

Int. Cl.³ C07D *487/04*; A61K *31/40*

U.S. Cl. 424—274 **74 Claims**

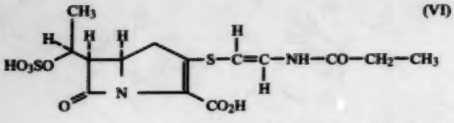
1. A compound of the formula (VI):



(VI)

a pharmaceutically acceptable salt, the lithium salt or a pharmaceutically acceptable ester thereof, said ester being one which is convertible to the free acid or salt thereof by biological methods or chemical methods.

23. A pharmaceutical composition useful for treating bacterial infections in humans and animals and for effecting β-lactamase inhibition in humans and animals which comprises an antibacterially effective amount or a β-lactamase inhibitory amount of a compound of the formula (VI):


(VI)

or a pharmaceutically acceptable salt or pharmaceutically acceptable ester thereof, in combination with a pharmaceutically acceptable carrier.

4,421,761

THIOPHENE DERIVATIVES

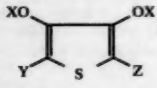
Shigeki Nagai, Hirota; Yojiro; Takashi Yorie; Hisao Sugiura; Toru Hibi, all of Ube; Katsumi Sato, Hiratsuka; Takuo Wada, Hatano, and Masahiko Miyahara, Atsugi, all of Japan, assignors to Hokko Chemical Industry Co. Ltd. and Ube Industries, Ltd., both of, Japan

Filed Jan. 27, 1981, Ser. No. 228,696

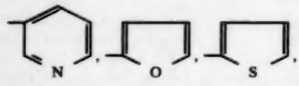
Int. Cl.³ A01N *43/02;* **C07D** *333/24*

U.S. Cl. 424—275 **12 Claims**

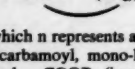
1. A thiophene derivative of the general formula



wherein X represents hydrogen atom, alkali metal, $—NH_4$, $—COR_1$ (in which R_1 represents phenyl, halophenyl, lower alkyl, lower alkenyl, lower alkoxy lower alkyl, lower alkylthio lower alkyl, lower haloalkyl,

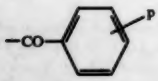


cycloalkyl, or lower alkylthio), —CO-lower alkyl-R_2 (in which R_2 represents lower alkylcarbonyloxy or lower alkoxycarbonyl),

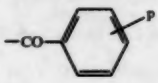


(in which n represents an integer of 4 to 6 inclusive), di-lower alkylcarbamoyl, mono-lower alkylcarbamoyl, cycloalkylcarbamoyl, $—COOR_3$ (in which R_3 represents lower alkyl, lower alkenyl, lower alkynyl, lower haloalkyl, lower alkoxy lower alkyl, lower alkoxycarbonyl lower alkyl, phenyl, substituted phenyl or benzyl), $—SO_2R_4$ (in which R_4 represents lower alkyl, lower alkyl-substituted phenyl or di-lower alkylamino) or

(in which R_5 represents lower alkyl); Y represents $COOR_6$ (in which R_6 represents alkyl, lower alkenyl, lower alkynyl, lower alkoxy lower alkyl or benzyl), hydrogen atom or



(in which p represents hydrogen atom, halogen atom or lower alkyl); and Z represents $—COOR_6$ (in which R_6 is as defined above), cyano or



(in which p is as defined above), provided that both Y and Z are not $—COOR_6$ (in which R_6 represents alkyl, lower alkenyl or lower alkynyl) when X represents hydrogen atom, alkali metal or $—NH_4$.

4,421,762

METHOD OF TREATMENT OF AN ALLERGY TO AN INGESTED ALLERGEN

George Wardell, Loughborough, England, assignor to Fisons Limited, London, England

Continuation-in-part of Ser. No. 941,632, Sep. 12, 1978, abandoned, which is a continuation-in-part of Ser. No. 755,606, Dec. 29, 1976, Pat. No. 4,152,448, which is a continuation of Ser. No. 471,139, May 17, 1974, abandoned, which is a continuation-in-part of Ser. No. 329,417, Feb. 5, 1973, abandoned. This application Sep. 8, 1981, Ser. No. 300,281

Claims priority, application United Kingdom, Feb. 15, 1972, 6911/72; Feb. 2, 1974, 4912/74

Int. Cl.³ A61K *31/35*

U.S. Cl. 424—283 **8 Claims**

1. A method of treatment of an allergy to an ingested allergen, which comprises per os administration of a daily dosage of from 20 to 4,000 mg of 1,3-bis(2-carboxychromon-5-yloxy)-2-hydroxypropane or a therapeutically acceptable salt thereof, as active ingredient to a patient having such an allergy.

4,421,763

CYCLOHEXANE DERIVATIVES, PROCESS FOR PREPARATION THEREOF AND MEDICINES CONTAINING THESE CYCLOHEXANE DERIVATIVES

Sachiyuki Hamano; Shinichi Kitamura, both of Tokyo; Toshiji Igarashi, Tokorozawa, and Yoshikage Nakajima, Tokyo, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

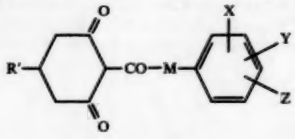
Division of Ser. No. 133,694, Mar. 25, 1980, Pat. No. 4,350,705. This application Mar. 26, 1982, Ser. No. 362,358

Claims priority, application Japan, Mar. 31, 1979, 54-37696; Sep. 10, 1979, 54-115240

Int. Cl.³ A61K *31/34, 31/12, 31/165;* **C07C** *49/30;* **C07D** *307/34*

U.S. Cl. 424—285 **11 Claims**

1. A compound having the formula



in which

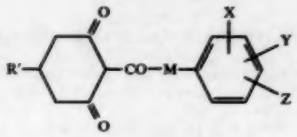
(1) R′ is phenyl, furyl or substituted phenyl, in which said substituted phenyl is substituted with from 1 to 5 substituents which are the same or different and are selected from the group consisting of alkyl having 1 to 6 carbon atoms, alkoxy having 1 to 6 carbon atoms, hydroxy, halogen, halogenated alkyl having 1 to 6 carbon atoms, amino, mono- or di-alkyl amino in which the alkyl has 1 to 6 carbon atoms and $—O—(CH_2)_a—O—$ bonded to any two adjacent carbon atoms of the phenyl nucleus and in which "a" is 1 or 2;

(2) M is $—CH_2—_m$, wherein "m" is zero or an integer from 1 to 4;

(3) X, Y and Z, which can be the same or different, are

hydrogen, lower alkyl, lower alkoxy, lower alkyl carbonyloxy, hydroxy, lower alkyl sulfonyl, nitro, cyano or halogen; and pharmacologically acceptable salts thereof.

11. A method treating a subject suffering from hypertension which comprises administering to that subject an effective antihypertensive amount of a compound having the formula



in which

(1) R′ is phenyl, furyl or substituted phenyl, in which said substituted phenyl is substituted with from 1 to 5 substituents which are the same or different and are selected from the group consisting of alkyl having 1 to 6 carbon atoms, alkoxy having 1 to 6 carbon atoms, hydroxy, halogen, halogenated alkyl having 1 to 6 carbon atoms, amino, mono-or di-alkyl amino in which the alkyl has 1 to 6 carbon atoms and —O—$(CH_2)_a$—O— bonded to any two adjacent carbon atoms of the phenyl nucleus and in which "a" is 1 or 2;

(2) M is —$(CH_2)_m$— or —NH—, wherein "m" is zero or an integer from 1 to 4;

(3) X, Y and Z, which can be the same or different, are hydrogen, lower alkyl, lower alkoxy, lower alkyl carbonyloxy, hydroxy, lower alkyl sulfonyl, nitro, cyano or halogen;

and pharmacologically acceptable salts thereof.

4,421,764

USE OF 9-ANTHROYLCHOLINE IN THE UTERUS TO PREVENT PREGNANCY

Milton J. Cormier, Bogart, Ga., assignor to University of Georgia Research Foundation, Inc., Athens, Ga.

Division of Ser. No. 253,567, Jul. 6, 1981, Pat. No. 4,377,577, which is a continuation-in-part of Ser. No. 155,800, May 30, 1980. This application Jul. 14, 1982, Ser. No. 398,298

Int. Cl.³ A61K *31/235*

U.S. Cl. 424—308 8 Claims

1. A method of preventing pregnancy in a female which comprises introducing an effective amount of the drug 9-anthroylcholine directly into the uterus of the female after sexual intercourse.

4,421,765

SUBSTITUTED PHENYLACETIC ACID AMIDE COMPOUNDS

Alfred Sallmann, Bottmingen, and Gerhard Baschang, Bettingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

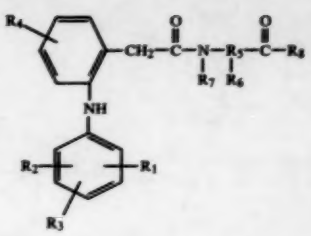
Division of Ser. No. 33,295, Apr. 25, 1979, Pat. No. 4,250,192, which is a continuation of Ser. No. 905,087, May 11, 1978, abandoned, and Ser. No. 906,292, May 15, 1978, abandoned. This application Oct. 3, 1980, Ser. No. 193,776

Claims priority, application Luxembourg, May 11, 1977, 77316; Sep. 9, 1977, 78106

Int. Cl.³ A61K *31/24*; C07C *101/44*

U.S. Cl. 424—309 10 Claims

1. A phenylacetic acid amide compound of the formula



in which each of R_1 and R_2 is hydrogen, lower alkyl, lower alkoxy, halogen having an atomic number of not more than 35 or trifluoromethyl, each of R_3 and R_4 is hydrogen, lower alkyl, lower alkoxy or halogen having an atomic number of not more than 35, R_5 is lower alkylene or lower alkylidene, R_6 is carboxy, lower alkoxycarbonyl, phenyl-lower alkoxycarbonyl or aminocarbonyl, R_7 is hydrogen, and the group of the formula —C(=O)—R_8 is carboxyl, lower alkoxycarbonyl, or substituted carbamoyl of the formula

—C(=O)—N(R_7^a)—R_5^a(R_6^a)—C(=O)—R_8^a

in which R_5^a is lower alkylene or lower alkylidene, R_6^a is phenyl or phenyl substituted by hydroxy, R_7^a is hydrogen and R_8^a is carboxy or lower alkoxycarbonyl, wherein the radical of the formula —NR_7—R_5(R_6)—CO—R_8 has the L-configuration, or a therapeutically acceptable salt thereof.

10. A pharmaceutical preparation containing an antiinflammatory effective amount of a compound as claimed in claim 1 together with conventional pharmaceutical excipients.

4,421,766

METHOD OF PRESERVING ORGANIC MATERIALS FROM FUNGAL ATTACK AND A COMPOSITION FOR USE IN SUCH A METHOD

Yasuhiro Morisawa; Kiyoshi Konishi, and Mitsuru Kataoka, all of Hiromachi, Japan, assignors to Sankyo Co., Ltd., Tokyo, Japan

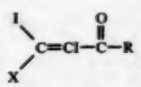
Filed Jan. 8, 1982, Ser. No. 338,141

Claims priority, application Japan, Jan. 13, 1981, 56-3364

Int. Cl.³ A01N *37/02, 37/06*

U.S. Cl. 424—311 12 Claims

1. A method of protecting degradeable organic material from fungal attack by applying to or admixing with said material an anti-fungal effective amount of a compound of formula (I):



(I)

wherein: X represents a chlorine, bromine or iodine atom; and R represents a hydroxy group or a C_1–C_6 alkoxy group.

4,421,767

COMPOUNDS AND METHODS FOR TREATING DEPRESSION

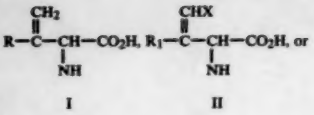
Michael G. Palfreyman, Fegersheim, and Ian A. McDonald, Truchtersheim, both of France, assignors to Merrell Toraude et Compagnie, Strasbourg, France

Continuation-in-part of Ser. No. 268,553, Jun. 1, 1981, abandoned. This application Sep. 13, 1982, Ser. No. 417,751

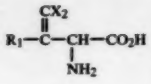
Int. Cl.³ C07C *101/77, 101/72*; A61K *30/95, 31/24*

U.S. Cl. 424—319 36 Claims

1. A compound of the formula:



I II



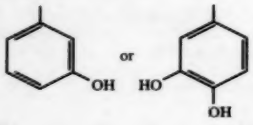
III

wherein:

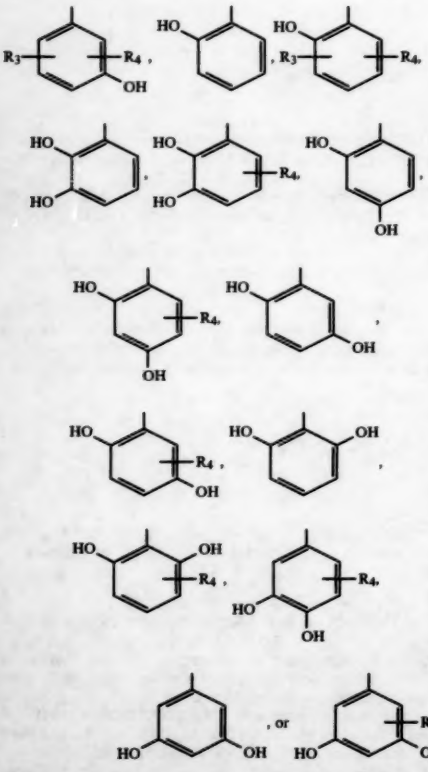
X is fluorine, chlorine, or bromine;

R is the group R_2 as defined below;

R_1 is a group of the formula:



or the group R_2 as defined below; wherein R_2 is:



wherein R_3 is hydrogen, (C_1–C_4)alkyl, or (C_1–C_4)alkoxy, and R_4 is (C_1–C_4)alkyl or (C_1–C_4)alkoxy; or a (C_1–C_8)alkyl ester thereof; or a non-toxic pharmaceutically acceptable salt thereof.

27. A method for treating depression which comprises administering to a depressed patient an effective amount of a compound as defined in claim **1**.

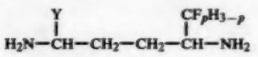
4,421,768

FLUORINATED DIAMINO-HEPTENE AND-HEPTYNE DERIVATIVES

Patrick Casara, Truchtersheim, and Charles Danzin, Strasbourg, both of France, assignors to Merrell Toraude et Compagnie, Strasbourg, France

Filed Aug. 11, 1982, Ser. No. 407,225
Int. Cl.³ A61K *31/13;* **C07C** *87/26*
U.S. Cl. 424—325 **11 Claims**

1. A fluorinated diamino-heptene or -heptyne derivative of the following Formula I:



Formula I

wherein:

Y represents $CH_2{=}CH-$ or $CH{\equiv}C-$; and

p represents 1 or 2

or a pharmaceutically acceptable salt thereof.

10. A pharmaceutical composition for inhibiting ornithine decarboxylase comprising a compound as defined in claim **1** as an active ingredient and a pharmaceutically acceptable carrier or diluent.

4,421,769

SKIN CONDITIONING COMPOSITION

Thomas J. Dixon, and Gary R. Kelm, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Sep. 29, 1981, Ser. No. 306,807
Int. Cl.³ A61K *7/40, 7/48*
U.S. Cl. 424—358 **9 Claims**

1. A skin conditioning composition comprising:

(A) from about 5% to about 30% glycerin;

(B) from about 0.5% to about 10% of a volatile silicone or mixtures thereof selected from the group consisting of methylsiloxane fluids having the average unit formula

$$(CH_3)_aSiO_{\frac{(4-a)}{2}}$$

wherein a has an average of from 2 to 3, inclusive;

(C) from about 0.05% to about 1% of a polydiorganosiloxane-polyalkylene copolymer containing at least one polydiorganosiloxane segment and at least one polyoxyalkylene segment, said polydiorganosiloxane segment consisting essentially of

$$R_bSiO_{\frac{(4-b)}{2}}$$

siloxane units wherein b has a value of from 0 to 3, inclusive, there being an average value of approximately 2 R radicals per silicon for all siloxane units in the copolymer, and R denotes a radical selected from the group consisting of methyl, ethyl, vinyl, phenyl and a divalent radical bonding said polyoxyalkylene segment to the polydiorganosiloxane segment, at least 95% of all R radicals selected from the group consisting of carbon, hydrogen, nitrogen, and oxygen being methyl; and said polyoxyalkylene segment having an average molecular weight of at least 1000 and consisting of from 0 to 50 mol percent polyoxypropylene units and from 50 to 100 mol percent polyoxyethylene units, at least one terminal portion of said polyoxyalkylene

segment being bonded to said polydiorganosiloxane segment, any terminal portion of said polyoxyalkylene segment not bonded to said polydiorganosiloxane segment being satisfied by a terminating radical; the weight ratio of polydiorganosiloxane segments to polyoxyalkylene segments in said copolymer having a value of from 2 to 8;

(D) from about 0.25% to about 5% of a surfactant or mixture of surfactants having an HLB of from about 8 to about 14; and

(E) the remainder water.

4,421,770

METHOD OF PREPARING HIGH PROTEIN SNACK FOOD FROM EGG PROTEIN

Jan M. Wiker, Rowland Heights, Calif., and Franklin E. Cunningham, Leonardville, Kans., assignors to Kansas State University Research Foundation, Manhattan, Kans.

Filed Mar. 24, 1982, Ser. No. 361,411

Int. Cl.³ A23J *3/00*; A23L *1/32*

U.S. Cl. 426—89 **13 Claims**

1. The method of preparing a high protein snack food from egg whites for frozen storage, comprising:

(a) preparing a liquid heat-coagulable egg protein composition from raw egg whites or from a mixture of raw egg whites and raw whole eggs, said composition containing from 6 to 14% of heat-coagulable egg protein solids dispersed in water, said percentages being by weight based on the total composition;

(b) introducing said composition into a heated mold and coagulating said composition therein to form a shaped body;

(c) cutting said body after cooling to form a plurality of coagulum pieces;

(d) coating the exterior surfaces of said pieces with a liquid batter mix containing at least 35% by weight solids in a water suspension, said solids including starch-containing ingredients providing at least 10% by weight of gelatinizable starch based on said batter mix; and

(e) deep fat frying said battered coagulum pieces to seal the outer surfaces of said coagulum, whereby water weeping of said pieces during frozen storage, thawing, and reheating is substantially prevented.

4,421,771

CHOCOLATE COVERED NUTRIENT BARS

Karl-Wilhelm Stock, Buettelborn, Fed. Rep. of Germany; Norman Brudney, Paris, France, and Horst G. P. Wienecke, Gross-Gerau, Fed. Rep. of Germany, assignors to Richardson GmbH, Gross-Gerau, Fed. Rep. of Germany

Filed Dec. 18, 1981, Ser. No. 332,011

Claims priority, application Fed. Rep. of Germany, Int. Cl.³ A21D *13/00*

U.S. Cl. 426—94 **6 Claims**

1. A chocolate covered bar having waffles, wafers or biscuits covering sheets portions and containing a filling, said filling comprising a water-containing raw material containing about 5 to 50% vegetable fibrous materials by weight of the filling and having a moisture content between 5 to 20 percent.

4,421,772

METHOD FOR IDENTIFYING BOTANICAL COMPONENT PARTS OF GROUND SEEDS

Lars Munck, Helsingor; Gregory C. Gibbons, Virum, and Carol Feil, Greve Strand, all of Denmark, assignors to De Forenede Bryggerier A/S, Copenhagen, Denmark

Continuation of Ser. No. 88,231, Oct. 25, 1979, abandoned. This application Aug. 26, 1981, Ser. No. 296,612

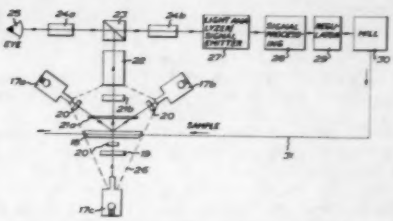
Claims priority, application Sweden, Nov. 1, 1978, 7811307

Int. Cl.³ G01N *21/64, 33/02*; G01J *3/30*

U.S. Cl. 426—231 **23 Claims**

1. A method of identifying the proportions of starchy endosperm parts, aleurone layer parts and hull layer parts in a product produced by the disintegration of seeds having such parts comprising the steps of

irradiating the product with electromagnetic radiation in a wavelength band of about 250 to about 300 nm to excite said starchy endosperm part of said product to fluoresce, electromagnetic radiation in a wavelength band of about



300 to about 370 nm to excite said aleurone layer parts of said product to fluoresce, and electromagnetic radiation in a wavelength band of about 410 to about 490 nm to excite said hull layer parts of said product to fluoresce, and analyzing the resulting fluorescence emitted by said product to identify relative starchy endosperm, aleurone layer, and hull layer proportions in said product.

4,421,773

PROCESS FOR MOLDING CHOCOLATE TO MAKE CHOCOLATE BLOCK HAVING ORNAMENTAL PATTERN AND INTERNAL HOLLOW CAVITY

Tokuji Akutagawa, Tokyo, Japan, assignor to Akutagawa Chocolate Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 260,250, May 5, 1981, Pat. No. 4,382,968. This application Mar. 10, 1983, Ser. No. 474,077

Int. Cl.³ A23G *1/00, 1/21*

U.S. Cl. 426—249 **13 Claims**

1. A process for molding chocolate to make a molded product including a thin ornamental relief pattern made of a first chocolate material of one color and a body portion carrying said thin ornamental relief pattern and made of a second chocolate material of different color, said body portion having a hollow cavity internally thereof, said first and second chocolate materials containing 30 to 40%, by weight, of the same kind of base oils and fats, and the difference between the content of base oils and fats in said first chocolate material and the content of base oils and fats in said second chocolate material being 10%, by weight, or less, said process comprising the steps of:

(a) fluidizing said first chocolate material by heating;

(b) casting said fluidized first chocolate material into an engraved pattern formed on the face of a first mold;

(c) scraping said face of said first mold to press said first chocolate material into said engraved pattern and to scrape off the excess material;

(d) rapidly cooling the surface of said first chocolate material to a temperature of from 18° C. to 22° C. thereby to crystallize the base oils and fats contained in said first chocolate material to form microcrystallites;

(e) fluidizing said second chocolate material by heating;

(f) pouring into a second mold said fluidized second chocolate material in an amount of at least 30% by volume of the total apparent volume of the molded product including the volume of the hollow cavity;

(g) placing the first mold on at least said second mold so that at least said second mold is closed by said first mold;

(h) rotating and vibrating said closed mold formed by said first mold and at least said second mold at such a speed as not to allow said first chocolate material to be effected by centrifugal force while said micro-crystallites are growing in said first chocolate material so that said fluidized second chocolate material is allowed to adhere substantially uni-

formely onto the inner faces of said closed mold, thereby forming an empty or hollow center cavity;

(i) cooling the whole body to be solidified by crystallization of the base oils and fats contained in said second chocolate material in all the regions including the interface region at which said second chocolate material penetrates into and adjoins to said first chocolate material; and

(j) opening said closed mold to remove the solified product therefrom.

4,421,774

GASEOUS ANTIMICROBIAL TREATMENTS OF STORAGE GRAIN WITH SULFUR DIOXIDE AND AMMONIA

Frederick D. Vidal, Englewood Cliffs, and Anantharaman Jayaraman, Nutley, both of N.J., assignors to Pennwalt Corporation, Philadelphia, Pa.

Division of Ser. No. 163,410, Jun. 26, 1980, Pat. No. 4,350,709, which is a continuation-in-part of Ser. No. 156,501, Jun. 4, 1980, Pat. No. 4,309,451, which is a division of Ser. No. 50,162, Jun. 20, 1979, abandoned, said Ser. No. 163,410, is a continuation-in-part of Ser. No. 38,739, May 14, 1979, abandoned. This application May 3, 1982, Ser. No. 374,458

Int. Cl.³ A23B *9/00*; **A23L** *3/34*

U.S. Cl. 426—319 **4 Claims**

1. A method of treating moist grain to produce a preserved grain product which resists spoilage, comprising the steps of:

(a) perfusing an effective amount of SO_2 gas through said grain for a period of time sufficient to assure adequate contact between the SO_2 and the grain;

(b) permitting said grain to react with said SO_2 for a preselected period of time and under conditions suitable to produce an intermediate grain product by the SO_2 penetrating the grain thereby effecting antimicrobial actions in the grain;

(c) perfusing said intermediate grain product with an effective amount of ammonia gas to produce a preserved grain product which resists spoilage.

4,421,775

METHOD FOR REMOVING THE OUTER WAXY CUTIN-CONTAINING LAYER FROM PAPAYA

Harvey T. Chan, Jr., Hilo, Hi., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jun. 4, 1982, Ser. No. 385,172

Int. Cl.³ A23L *1/212*; **A23P** *1/00*

U.S. Cl. 426—482 **2 Claims**

1. A method for removing the outer waxy, cutin-containing layer from papaya, comprising:

(a) freezing the papaya at a predetermined temperature to form a frozen papaya;

(b) freeze-drying the frozen papaya for a time sufficient to cause the outer waxy, cutin-containing layer to form a film around the papaya and to cause the underlying papaya to shrink so that the outer layer becomes separated from the underlying papaya; and

(c) mechanically removing the so-separated layer.

4,421,776

METHOD AND DEVICE FOR ROLLING A DOUGH MASS INTO A CONTINUOUS SHEET

Bernardus H. C. Brinkers, Wassenaar, and Willem B. A. N. Veenman, Rijnsaterwoude, both of Netherlands, assignors to Koninklijke Brinkers Margarinefabrieken B.V., Zoetermeer, Netherlands

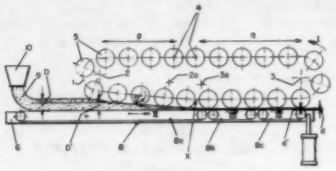
Filed Nov. 9, 1981, Ser. No. 319,142

Claims priority, application Netherlands, Jan. 20, 1981, 8100256

Int. Cl.³ A21C *3/02, 13/00*

U.S. Cl. 426—502 **3 Claims**

1. A method of rolling to compress a layer of dough into a continuous sheet, comprising the step of transporting the dough layer on a conveying surface while compressing the dough layer by means of a series of rotatable rolls which travel in the same direction but at a greater linear speed than said conveying surface, wherein the improvement comprises the



step of intermittently relaxing the dough layer by eliminating the contact between said rolls and the dough layer, to release completely and then restore the pressure of said rolls against the dough layer at least once during the travel of said rolls along each portion of the dough layer.

4,421,777

METHOD FOR IMPROVING THE YIELD OF CHOCOLATE CAKE

Frank H. Y. Chung, Norwalk, Conn., assignor to Nutrisearch Company, Cincinnati, Ohio

Filed Mar. 27, 1981, Ser. No. 248,592

Int. Cl.³ A21D *10/04*

U.S. Cl. 426—553 **7 Claims**

1. In a process for preparing a chocolate flavored cake comprising mixing together and baking the ingredients comprising flour, water, egg, sugar, chocolate or cocoa, milk or non-fat dry milk, oil or shortening, salt, baking powder and emulsifier,

the improvement comprising adding to said ingredients (1) a whey-protein-containing composition in an amount of about 3% to about 15% on a flour basis, in combination with (2) an amount of sodium bicarbonate sufficient to elevate the pH of the cake crumb to a pH within the range of from 7.5 to about 9, wherein

said whey protein-containing composition comprises: (a) at least about 40% of a whey protein concentrate having at least 35% whey protein, (b) from 0 to about 50% of a second whey protein-containing composition different from said whey protein concentrate (a), and (c) from 0 to about 35% of another dairy protein-containing product, the total protein in said whey protein-containing composition being at least 50% whey protein

whereby the resulting chocolate flavored cake is characterized by good volume, good color and good flavor.

4,421,778

FREEZER STABLE WHIPPED ICE CREAM AND MILK SHAKE FOOD PRODUCTS

Marvin L. Kahn, Williamsville, and Robert J. Lynch, Buffalo, both of N.Y., assignors to Rich Products Corporation, Buffalo, N.Y.

Filed Nov. 4, 1982, Ser. No. 439,129

Int. Cl.³ A23G *9/02, 9/04*

U.S. Cl. 426—564 **37 Claims**

1. A whipped food product comprised of an oil-in-water emulsion of nonfat milk solids, and about 40% to about 70% water, and sugar in a ratio to water of about 1:1.75 to about 3.0, said sugar being comprised of at least about 30% fructose and/or dextrose; and about 3% to about 10% fat, wherein at least about 50% of said fat is a solid beta phase-tending crystalline fat, and minor effective amounts of flavoring, emulsifier, and stabilizers comprised of microcrystalline cellulose and sodium carboxymethylcellulose, wherein the product is substantially noncrystalline and spoonable at about 0° F., and the

volume of the product remains substantially constant during storage at about 0° F. for at least about six months.

4,421,779

PROCESS FOR TREATING CONFECTIONERY

John E. Baker; Michael G. Topor, both of Farmers Branch; John T. Ivers, Lewisville, and H. Kent Stutz, Hurst, all of Tex., assignors to Frito-Lay, Inc., Dallas, Tex.

Filed May 10, 1982, Ser. No. 376,728
Int. Cl.³ A23G 3/00
U.S. Cl. 426—660 4 Claims

1. A process for treating a confectionery to enhance the forming properties thereof, said confectionery comprised of sugar, water and fat containing at least about 50% unsaturated fatty acid and less than about 10% lauric acid moieties, based on the total fatty acid moiety content, which comprises melting said confectionery and cooling the melted confectionery through the temperature range of about 120° F. to about 78°–85° F. slowly at an average rate no greater than about 1.25° F. per hour to provide the confectionery with a dough-like consistency wherein the forming properties are enhanced and said confectionery may be formed without destroying its structure.

4,421,780

HEAT-SEALABLE POLYOLEFIN FILMS AND PROCESSES FOR THEIR PREPARATION

Pierpaolo Buzio, Rho; Lucio Edefonti, Busto Arsizio, and Gianluigi Argela', Arese, all of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Dec. 16, 1981, Ser. No. 331,361
Claims priority, application Italy, Dec. 24, 1980, 26966 A/80
Int. Cl.³ B05D 3/00
U.S. Cl. 427—40 22 Claims

1. A process for preparing heat-sealable polyolefin films comprising:

(a) treating the surfaces of a polyolefin film with an aqueous or an aqueous-alcoholic solution containing from about 0.5 to 2% by weight of a primer;

(b) washing a first surface of said film with water at room temperature;

(c) drying the washed film in the presence of a gaseous flow at a temperature of from about 50° to 100° C.;

(d) treating the unwashed second surface of said film with an organic solvent solution containing from about 20to 40% by weight of a lacquer; and

(e) drying the film in the presence of a gaseous flow at a temperature of from about 60° to 120° C.

4,421,781

CONTINUOUS VACUUM CURING AND SOLVENT RECOVERY COATING PROCESS

David Reznik, Haifa, Israel, assignor to Tri/Valley Growers, San Francisco, Calif.

Filed Mar. 29, 1982, Ser. No. 362,628
Int. Cl.³ B05D 3/02, 1/40, 3/12; C23C 13/08
U.S. Cl. 427—46 24 Claims

1. A process for coating a substrate which comprises:

establishing a vacuum in a vacuum chamber,

applying a polymerizable coating material in a vacuum liquifiable solvent to the substrate,

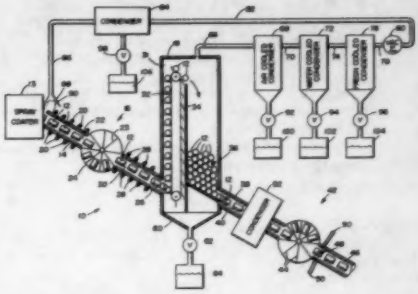
heating the substrate in a confined space around an entrance to the vacuum chamber to evaporate a sufficient amount of the solvent for the substantial exclusion of air around the entrance to the vacuum chamber,

admitting the coated substrate and evaporated vacuum condensable solvent to the vacuum chamber to the substantial exclusion of air,

condensing the solvent while subject to the chamber vacuum, and

heating the substrate a second time to cure said polymerizable material.

4. The process of claim 1 in which the substrate is a metal can body.



5. The process of claim 4 in which the metal substrate is heated by induction.

4,421,782

PROCESS FOR PROVIDING IMPROVED RADIATION-CURABLE SURFACE COVERINGS AND PRODUCTS PRODUCED THEREBY

Nicholas C. Bolgiano, East Hempfield Township, Lancaster County, and William T. Sigman, Eden Township, Lancaster County, both of Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.

Continuation-in-part of Ser. No. 314,988, Oct. 26, 1981, abandoned. This application Jun. 17, 1982, Ser. No. 389,164
Int. Cl.³ B05D 3/06
U.S. Cl. 427—53.1 80 Claims

1. A process for preparing a composite layer material comprising the steps of:

depositing a first layer of a composition which is curable by exposure to actinic radiation on a support,

preparing a solution comprising water, from about 0.1 to about 75% by weight of acrylic acid and from about 0.01 to about 5% by weight of a suitable surfactant which is compatible with said acrylic acid and which enables said solution to wet said first layer,

depositing a layer of said solution on said first layer, and

exposing the pair of layers to actinic radiation.

41. A composite layer material having improved durability, abrasion resistance, and stain resistance, said material being obtained by irradiating with actinic radiation a first uncured layer which is curable by exposure to said radiation, said layer being coated prior to irradiation with a layer of an aqueous solution comprising from about 0.1 to about 75% by weight of acrylic acid and from about 0.01 to about 5% by weight of a suitable surfactant which is compatible with said acrylic acid and which enables said solution to wet said first uncured layer.

4,421,783

PROCESS FOR COATING SUBSTRATES

Heinrich Marwitz; Kurt Ullrich, and Karl Hahn, all of Burghausen, Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Munich, Fed. Rep. of Germany

Filed Feb. 4, 1982, Ser. No. 345,853
Claims priority, application Fed. Rep. of Germany, Mar. 6, 1981, 3108595
Int. Cl.³ B05D 3/06, 3/02
U.S. Cl. 427—54.1 11 Claims

1. A process for coating a substrate, which comprises coating the substrate with a composition containing

(1) a diorganopolysiloxane having terminal SiC-bonded vinyl groups,

(2) an organopolysiloxane having at least 3 Si-bonded hydrogen atoms per molecule,

(3) a catalyst which promotes the addition of Si-bonded hydrogen to an aliphatic multiple bond,

(5) a diorganopolysiloxane having a viscosity of at least 10^6 mPa.s at 25° C., in which a vinyl group is bonded to the silicon atom in 0.033 to 3.33 percent of the diorganosiloxane units, while the remaining organic radicals in the diorganosiloxane units of the diorganopolysiloxane are free of aliphatic multiple bonds,

(6) an organosilicon adhesive compound which promotes adhesion and an organic solvent and thereafter cross-linking the coated substrate.

11. The process of claim 1, wherein the coated substrate is cross-linked with ultraviolet light.

4,421,784

PROCESS FOR PRODUCING TEXTURED COATINGS

Harden H. Troue, Plainfield, Ind., assignor to Union Carbide Corporation, Danbury, Conn.

Filed Feb. 12, 1982, Ser. No. 348,345

Int. Cl.³ B05D *3/02, 3/06*

U.S. Cl. 427—54.1 **3 Claims**

1. In a process for providing a textured or woven coating on a substrate, which coating has a thickness of about 0.1 mil to about 10 mils, comprising the following steps:

(a) applying a coating, which is curable with ultraviolet light, to the substrate, said coating having a viscosity, as applied, of at least about 50 centipoises;

(b) exposing the coated substrate to ultraviolet light having wavelengths in the range of about 1800 Angstroms to about 2750 Angstroms in an inert atmosphere for a period of time sufficient to initiate texturing at the surface of the coating;

(c) maintaining the coated substrate from step (b) in a space essentially devoid of ultraviolet light for a period of time sufficient for the surface of the coating to texture; and

(d) exposing the coated substrate from step (c) to ultraviolet light having wavelengths in the range of about 1800 Angstroms to about 4000 Angstroms in an inert atmosphere or air until the coating is essentially cured,

the improvement comprising, after step (a) and prior to step (b), increasing the viscosity of the coating by exposing the coating to ultraviolet light, said viscosity being increased to a viscosity no higher than that at which the coating is capable of being textured in steps (b) and (c), above.

4,421,785

SUPERCONDUCTIVE TUNNEL JUNCTION DEVICE AND METHOD OF MANUFACTURE

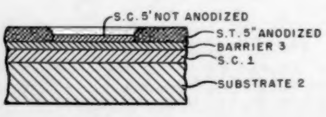
Harry Kroger, Sudbury, Mass., assignor to Sperry Corporation, New York, N.Y.

Filed Aug. 18, 1980, Ser. No. 179,311

The portion of the term of this patent subsequent to Nov. 27, 1996, has been disclaimed.

Int. Cl.³ B05D *5/12*

U.S. Cl. 427—63 **15 Claims**



1. A method of manufacturing a superconductive tunnel junction device including at least one superconductive tunnel junction defined as a predetermined active region comprising the steps of

forming a first layer of superconductive material on said substrate,

forming a barrier layer of barrier material on said first layer,

forming a second layer of superconductive material on said barrier layer, and

rendering insulating at least the entire thickness of said second layer of superconductive material except at said predetermined active region for defining said tunnel junction, and with the exception of said first layer of superconductive material which remains substantially unconverted to insulating material,

the unconverted second layer at said predetermined active region providing an upper electrode for said tunnel junction, the barrier layer underlying said upper electrode providing a tunnelling barrier for said tunnel junction and the unconverted first layer underlying said tunnelling barrier providing a lower electrode for said tunnel junction,

electrical contact to said lower electrode being effected through the unconverted first layer laterally adjacent said predetermined active region.

4,421,786

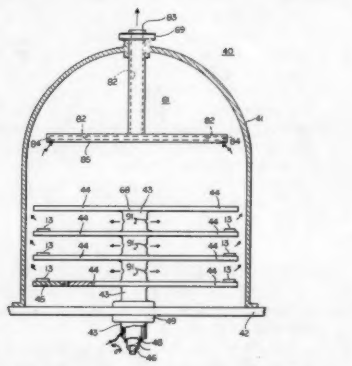
CHEMICAL VAPOR DEPOSITION REACTOR FOR SILICON EPITAXIAL PROCESSES

Roop L. Mahajan, Lawrenceville, and Joseph R. Ristorcelli, Jr., Belle Mead, both of N.J., assignors to Western Electric Co., New York, N.Y.

Division of Ser. No. 227,873, Jan. 23, 1981, abandoned. This application Jun. 1, 1982, Ser. No. 383,881

Int. Cl.³ H01L *21/02*

U.S. Cl. 427—82 **2 Claims**



1. A method of depositing a thin film of a material on a plurality of semiconductor wafers, comprising the steps of:

placing the wafers on resistance heated portions on each of a plurality of vertically spaced, parallel, planar wafer holders, said heated portions being vertically aligned and the holders having a centrally disposed, perforated, tube passing therethrough;

directing a gaseous reactant material through the perforated tube, radially outward, between the wafer holders;

maintaining an individually controlled, forced convective flow of the gaseous reactants across each holder and the wafers thereon; and

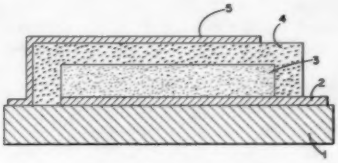
activating the resistance heated portions to conductively and radiatively heat the wafers on each holder to deposit a thin film of reactant material thereon.

4,421,787

PROCESS FOR FORMING A THIN DENSE SINTERED LAYER

Kenji Ikezawa, Yokohama; Hiroshi Takao, Kamakura; Hiroyuki Aoki, Noba, and Shinji Kimura, Yokohama, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Continuation of Ser. No. 58,428, Jul. 19, 1979, abandoned. This application May 14, 1981, Ser. No. 263,558
Claims priority, application Japan, Jul. 24, 1978, 53-089322
Int. Cl.³ B05D 5/12
U.S. Cl. 427—126.2 8 Claims



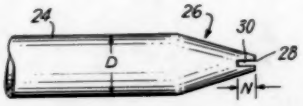
1. A process for forming a thin dense oxygen ion conductive solid electrolyte layer from a solid electrolyte paste of oxygen ion conductive solid electrolyte powder in an organic vehicle, said process comprising the steps, in the following order, of:
applying a solid electrolyte paste of Y_2O_3-ZrO_2 onto a substrate by a screen printing technique, and sintering said applied paste under sintering conditions; and
repeating at least one more time the above procedure of applying a paste of the same material as the initially applied paste onto said substrate provided with the sintered paste, and sintering the repeated application of paste under sintering conditions;
the sintering of the final application of paste being effected at a temperature of about 1420 degrees C., and the sintering of each application of paste prior to the final application of paste being effected at a temperature of 0.4 to 0.8 times the temperature used to sinter the final application of paste.

4,421,788

METHOD AND APPARATUS FOR COATING A SUBSTRATE WITH FOAMED PLASTIC

Fritz Kramer, Newport Beach, Calif., assignor to Sanifoam, Inc., Costa Mesa, Calif.

Filed Feb. 22, 1982, Ser. No. 351,027
Int. Cl.³ B05D 1/02
U.S. Cl. 427—136 4 Claims



1. A method of sealing a surface of a landfill with a layer of hardened plastic foam comprising the steps of:
forming a hardenable plastic foam under a gas pressure;
expelling said hardenable plastic foam through a slit toward said surface;
forming said slit and producing a value of said gas pressure effective to break up said hardenable plastic foam expelled through said slit into a high-speed spray of discrete particles of foam which impact on and adhere to said surface; and
permitting said hardenable plastic foam to harden on said surface.

4,421,789

PROCESS FOR TREATING THE SURFACES OF ALUMINUM HEAT EXCHANGERS

Hideaki Kaneko, Tokyo, and Kazuhisa Naito, Chiba, both of Japan, assignors to Occidental Chemical Corporation, Warren, Mich.

Filed Jun. 28, 1982, Ser. No. 393,000
Claims priority, application Japan, Jun. 30, 1981, 56-101703
Int. Cl.³ B05D 5/04
U.S. Cl. 427—204 8 Claims

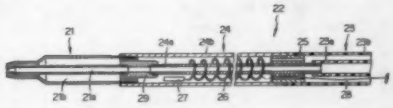
1. A method for the treatment of aluminum surfaces to provide thereon a corrosion resistant, hydrophilic coating which comprises forming on said aluminum surface a corrosion-resistant film having a thickness which is not in excess of about 10 microns and, thereafter, applying to said corrosion resistant film a top coating of fine silica particles, having a size within the range of about 1–100 millimicrons, the amount of said silica particles applied being at least sufficient to impart the desired degree of water wetability to the surface.

4,421,790

METHOD FOR COATING THE INNER SURFACE OF LONG TUBES OF SMALL DIAMETER

Koji Nagata; Mamoru Nishikawa, and Shiro Sato, all of Nagoya, Japan, assignors to Sumitomo Light Metal Industries, Ltd., Tokyo, Japan

Division of Ser. No. 228,682, Jan. 26, 1981, Pat. No. 4,370,944. This application Sep. 22, 1982, Ser. No. 421,343
Claims priority, application Japan, May 14, 1980, 55-63681
Int. Cl.³ B05D 7/22, 1/02
U.S. Cl. 427—236 3 Claims



1. A method for coating the inner surface of a long tube of small diameter by a spray coating, wherein a spray nozzle for spraying a paint is shifted from one end opening of the long tube to the other end opening thereof comprising:
inserting a supplying hose, longer than said long tube, provided with said spray nozzle attached to the tip of said supplying hose and respective passages for flowing the paint and flowing compressed air to said nozzle, into said long tube; and
heating said paint and said compressed air up to a predetermined temperature within said respective passage for spraying the heated paint from said nozzle by the action of the similarly heated compressed air.

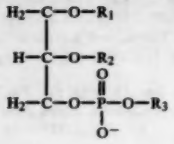
4,421,791

SIDE RELEASE AGENT FOR COAL CARS

George T. Kekish, Naperville, and Carol B. Batton, Bartlett, both of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Nov. 25, 1981, Ser. No. 324,767
Int. Cl.³ B05D 7/22; C09K 3/18, 5/00; C08L 91/00
U.S. Cl. 427—239 6 Claims

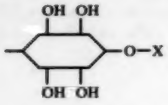
1. The method of reducing the freeze-adherence of coarse mineral particles to the metal surfaces of shipping containers, which method comprises the steps of applying to said surfaces a coating mixture of a naturally occurring phospholipid substance dispersed in a hydrocarbon liquid, in which the principal phospholipids have the structural formula:



wherein R_1 and R_2 are fatty acyl radicals containing from 8 to 18 carbon atoms and wherein R_3 is selected from:

$$-CH_2-CH_2-N^+-(CH_3)_3; \quad (A)$$

$$-CH_2-CH_2-NH_3^+; \text{ and} \quad (B)$$

 (C)

wherein X is one or more phosphate groups linked to one or more sugar molecules and subsequently adding coarse mineral particles to the container.

4,421,792

ADDITIVES FOR CLOTHES DRYERS

Jerome Rudy, Livingston, N.J., and Anthony A. Rapisarda, Elmhurst, N.Y., assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 161,639, Jun. 20, 1980, Pat. No. 4,327,133, which is a division of Ser. No. 853,663, Nov. 21, 1977, Pat. No. 4,238,531, which is a continuation of Ser. No. 589,993, Jun. 24, 1975, abandoned, which is a continuation of Ser. No. 376,586, Jul. 5, 1973, abandoned, which is a division of Ser. No. 158,090, Jun. 29, 1971, abandoned, which is a continuation of Ser. No. 821,476, May 2, 1969, abandoned. This application Mar. 10, 1982, Ser. No. 356,706

The portion of the term of this patent subsequent to Dec. 9, 1997, has been disclaimed.

Int. Cl.³ B05D *3/12*

U.S. Cl. 427—242 **12 Claims**

1. An article of manufacture for softening fabric by contacting damp fabric in a hot air tumbler fabric dryer in the drying cycle with said article, said article comprising:

(a) a composition which comprises:

(i) a fabric softening agent; and

(ii) at least 5 percent by weight of a distributing agent for said fabric softening agent wherein said distributing agent is meltable, sublimeable, soluble, softenable, or otherwise spreadable at the temperatures encountered in said fabric dryer; and

(b) a backing strip or sheet carrying said composition.

7. A method for applying a fabric softening agent to damp fabric in a hot air tumbler fabric dryer comprising adding to said fabric in the drying cycle an article of manufacture comprising:

(a) a composition which comprises:

(i) a fabric softening agent; and

(ii) at least 5 percent by weight of a distributing agent for said fabric softening agent wherein said distributing agent is meltable, sublimeable, soluble, softenable, or otherwise spreadable at the temperatures encountered in said fabric dryer; and

(b) a backing strip or sheet carrying said composition.

4,421,793

SELECTIVE GALVANIZING PROCESS USING A CALCIUM CARBONATE MASKING COMPOSITION

Ermes Moroni, Bresso, Italy, assignor to Hodigal s.a.s. di Luciano Moroni, Milan, Italy

Division of Ser. No. 169,602, Jul. 17, 1980, abandoned. This application May 6, 1982, Ser. No. 375,464

Claims priority, application Italy, Jul. 24, 1979, 24600 A/79; Dec. 21, 1979, 28352 A/79

Int. Cl.³ B05D *1/32*

U.S. Cl. 427—272 **13 Claims**

1. A process for selectively galvanizing a material adapted to be galvanized by immersion in a hot zinc melt, said process comprising:

applying to said material, prior to said galvanizing, in the areas which are to be masked from said galvanizing action a composition consisting essentially of:

about 60% to 99.9% by weight calcium carbonate and about 40% to 0.1% by weight of a chlorine containing compound.

4,421,794

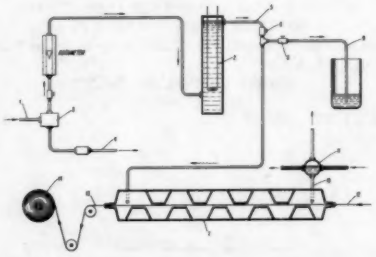
SOLVENT REMOVAL VIA CONTINUOUSLY SUPERHEATED HEAT TRANSFER MEDIUM

Homan B. Kinsley, Jr., Powhatan, Va., assignor to James River Corporation, Richmond, Va.

Continuation of Ser. No. 155,118, May 30, 1980, abandoned. This application Dec. 18, 1981, Ser. No. 332,212

Int. Cl.³ B05D *3/04*

U.S. Cl. 427—377 **22 Claims**



1. A process for the removal of a non-aqueous liquid from a high bulk, low density, porous cellulosic substrate having a void volume of from about 60 to 90 percent which is essentially completely impregnated with said non-aqueous liquid, comprising contacting such substrate with an effective amount of a condensable, vaporous heat transfer medium which is in a superheated state, and maintaining said substrate in contact with said superheated transfer medium, while also maintaining said heat transfer medium in superheated state, for a period of time sufficient to effect removal of substantially all said non-aqueous liquid from said substrate without concomitant condensation of said superheated heat transfer medium thereon.

4,421,795

METHOD OF APPLYING A COATING OF POLYARYLENE SULPHIDE TO A COOKING UTENSIL

Glyndwr J. Davies, Southall, England, assignor to The Glacier Metal Company Limited, Wembley, England

PCT No. PCT/GB81/00126, § 371 Date Mar. 3, 1982, § 102(e) Date Mar. 3, 1982, PCT Pub. No. WO82/00087, PCT Pub. Date Jan. 21, 1982

PCT Filed Jul. 2, 1981, Ser. No. 359,660

Claims priority, application United Kingdom, Jul. 4, 1980, 8022068

Int. Cl.³ B05D 3/02

U.S. Cl. 427—385.5 8 Claims

1. A method of applying a coating of polyarylene sulphide to a cooking utensil which comprises:

applying a mixture of polyarylene sulphide and an aryl ester of an aryl alcohol to the surface of a backing for forming a cooking utensil; and

subsequently heating said mixture to evaporate said ester and to cure said coating.

4,421,796

TREATING TEXTILE FIBRES

Peter M. Burril, Cowbridge, and Stephen Westall, Barry, both of Wales, assignors to Dow Corning Limited, Barry, Wales

Filed Sep. 24, 1982, Ser. No. 422,763

Claims priority, application United Kingdom, Oct. 3, 1981, 8129913

Int. Cl.³ B05D 3/02

U.S. Cl. 427—387 6 Claims

1. A process for the treatment of fibres which comprises contacting the said fibres with both (A) an organosilane of the general formula

$$Y_3SiR''^{+}R'X^{-}$$

wherein each Y represents a monovalent group having less than 6 carbon atoms selected from hydrocarbon groups, alkoxy groups and alkoxyalkoxy groups, at least one Y being alkoxy or alkoxyalkoxy, R represents a divalent group having from 3 to 10 carbon atoms, the said group being composed of carbon, hydrogen and, optionally, oxygen present in the form of ether linkages, hydroxyl groups or both, R′ represents a group selected from monovalent hydrocarbon groups having from 1 to 15 carbon atoms and groups of the general formula $(—OQ)_aOZ$, wherein Q represents an alkylene group having 2 or 3 carbon atoms, a has a value from 1 to 20 and Z represents a hydrogen atom, an alkyl group or an acyl group, each R″ represents a methyl group or an ethyl group and X represents a halogen atom, and (B) one or more organosiloxanes.

5. A process as claimed in claim 1 wherein (A) and (B) are applied to the fibres as a mixture.

6. A process as claimed in claim 5 wherein the treated fibres are heated to a temperature of from 100° C. to 200° C.

4,421,797

METHOD AND DEVICE FOR THE DRY-SPRAY APPLICATION OF CONCRETE TO A SUBSTRATE

Rainer Koehne, Müilheim-Speldorf, Fed. Rep. of Germany, assignor to Pressbau GmbH, Essen, Fed. Rep. of Germany

Filed Sep. 15, 1981, Ser. No. 302,449

Claims priority, application Fed. Rep. of Germany, Sep. 16, 1980, 3034851

Int. Cl.³ B05D 1/02

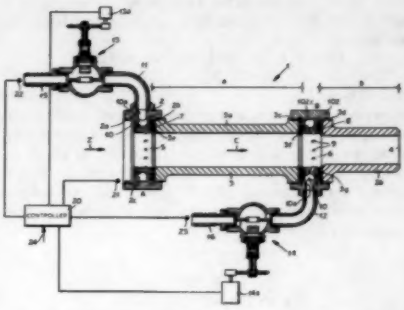
U.S. Cl. 427—403 8 Claims

1. A method of placing a synthetic-resin-containing dry spray concrete having a synthetic resin and cement as binders, said method comprising the steps of:

(a) feeding, by compressed air through a first inlet into a mixing body having a discharge nozzle at an end thereof, a dry mix of hydraulic cement and aggregate;

(b) feeding through a second nozzle and separately from said dry mix into said body a mixture of an epoxy resin and water;

(c) introducing a hardener for said epoxy resin into said body whereby said dry mix, said mixture of epoxy resin and



water and said hardener are mixed intimately in said body to form a concrete mix;

(d) discharging said concrete mix through said nozzle upon a substrate to deposit a concrete layer thereon; and

(e) varying the proportions of resin and hydraulic cement in said mix reciprocally while maintaining substantially constant the total volume formed by the resin and the hydraulic cement.

4,421,798

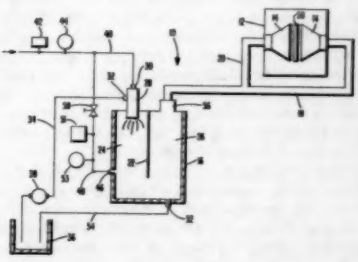
APPARATUS FOR COATING RECORDED DISCS WITH A LUBRICANT

Peter T. Lin, E. Brunswick, N.J., assignor to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 319,920, Nov. 10, 1981, abandoned. This application Dec. 6, 1982, Ser. No. 447,139

Int. Cl.³ B05D 1/02

U.S. Cl. 427—421 5 Claims



1. A method for coating a disc with a thin film of a lubricant comprising the steps of:

generating droplets of the lubricant at the top of one section of a chamber which is divided into two sections, which sections are connected together along the bottom of the chamber,

admitting air under pressure into said one section of the chamber above the connection between the two sections of the chamber to carry said lubricant droplets into the other section of the chamber and to carry at least some of the droplets upwardly through the other section to an outlet at the top of the other section, controlling the flow of the air into the one section so as to control the size of

the lubricant droplets carried upwardly through the other section, and directing the air-carried lubricant droplets flowing from the outlet onto the surface of a disc to be coated.

4,421,799

ALUMINUM CLAD REFRACTORY OXIDE FLAME SPRAYING POWDER

Edward R. Novinski, Mineola, N.Y., assignor to Metco, Inc., Westbury, N.Y.

Filed Feb. 16, 1982, Ser. No. 349,290

Int. Cl.³ B05D *1/08*

U.S. Cl. 427—423 **9 Claims**

8. A process for producing an abradable coating comprising:

flame spraying flame spray powder particles comprising a core comprising a member selected from the group consisting of zirconium oxide, magnesium oxide, hafnium oxide, cerium oxide, yttrium oxide and combinations thereof, wherein a coating of aluminum is bonded to the surface of said core.

4,421,800

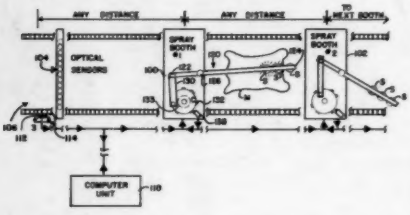
SPRAYING APPARATUS

Steve Schoenberg, Clifton Park, and David G. Ellis, Ballston Lake, both of N.Y., assignors to Digitronics Inventionering Corp., Clifton Park, N.Y.

Filed Feb. 2, 1982, Ser. No. 345,106

Int. Cl.³ B05D *1/02;* **B05B** *1/16, 12/00*

U.S. Cl. 427—424 **43 Claims**



27. A method for spraying at least one finishing substance onto a material carried on a conveyor along which at least one spray booth is positioned, each spray booth having at least one sprayer device associated therewith, each sprayer device being movable in cyclical fashion relative to the conveyor and having a valve for selectively permitting or inhibiting the dispensing of a substance therefrom, the method comprising:

positioning sensors across the conveyor and before the first spray booth along the conveyor;

detecting when material passes before each such sensor;

detecting the respective position of each sprayer device;

measuring the movement of the conveyor; and

executing a spray control operation comprising the steps of:

(a) determining the speed of the conveyor based on the conveyor movement measurements;

(b) determining the location and size of material on the conveyor based on the detection of material by the sensors;

(c) updating the position of each sprayer device; and

(d) determining which, if any, sprayer device is not properly positioned for spraying a substance onto material on the conveyor; and

maintaining each valve in a normally open state; and

wherein the operation executing step further comprises the step of:

(e) generating a valve close signal to a valve when the corresponding sprayer device is determined to be not properly positioned for spraying.

4,421,801

DECORATION STAND IN THE FORM OF A CHRISTMAS TREE

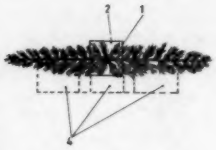
Harald Wahlfahrt, Herrngasse 2, 8803 Rothenburg ob der Tauber, Fed. Rep. of Germany

Filed Nov. 16, 1982, Ser. No. 442,119

Claims priority, application Fed. Rep. of Germany, Apr. 1, 1982, 8209353[U]

Int. Cl.³ A47G *33/06*

U.S. Cl. 428—19 **4 Claims**



1. A decoration stand in the approximate form of a Christmas tree comprising a base, an upright middle support mounted at its lower end portion to said base, a plurality of branches with needles extending therefrom, each of said branches mounted at one of its end portions to said middle support and extending laterally from said middle support, with some branches extending on one side of said middle support and with other branches extending on the other side of said middle support, said branches and said middle support all positioned in a common upright plane to form an outline of a Christmas tree, a plurality of article display members extending out of a common plane of the branches and middle support for exhibiting articles adjacent the outline of the Christmas tree.

4,421,802

AUTOMOTIVE DOOR SIDE MOLDING STRUCTURE

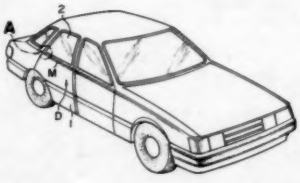
Toshihiro Mitsuoka, and Shojiro Seki, both of Yokohama, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed May 20, 1982, Ser. No. 380,450

Claims priority, application Japan, May 22, 1981, 56-73237[U]

Int. Cl.³ B60R *13/04*

U.S. Cl. 428—31 **9 Claims**



1. An automotive door side molding structure, comprising:

a molding body including a metallic molding base member provided along the waistline of a door panel, and a molding lip member of a resilient material secured along the length of said molding base member and adapted to be disposed in resilient contact with a door windowpane in a door sash;

said molding body being formed with a recessed portion at each of the front and rear end portions of said metallic molding base member thereof, each said recessed portion having a horizontal edge and vertical edge; and

end caps adapted to be fitted over said front and rear portions of said molding base member for covering said re-

cessed portions respectively, each of said end caps being provided with a protuberance protruding therefrom toward said door windowpane to cover at least partially the vertical edge of each said recessed portion, thereby keeping the vertial edge of each said recessed portion from direct contact with said door sash.

4,421,803

GLASS ENVELOPE FOR ELECTRIC LIGHT SOURCES

Andras Czeller; Istvan Kallai, and Laszlo Simenfalvi, all of Budapest, Hungary, assignors to Egyesült Izzolampa es Villamossagi Rt., Budapest, Hungary

Filed Dec. 11, 1979, Ser. No. 102,360
Claims priority, application Hungary, Dec. 12, 1978, EE 2610
Int. Cl.³ B32B *1/02, 3/14*
U.S. Cl. 428—35 **7 Claims**

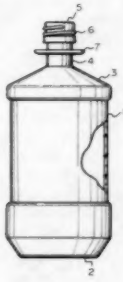
1. A glass envelope for electric light sources comprising:
an outer glass body;
a glass matrix adhering to the inner surface of the glass body and comprising pigment grains fully embedded into the glass matrix, said glass matrix being a cured glass forming precursor.

4,421,804

BOTTLE FOR CARBONATED DRINK

Fumio Mori, Yokohama; Junichi Itsubo; Hiroyuki Oda, both of Hiratsuka, and Gunji Matsuda, Isehara, all of Japan, assignors to Japan Crown Cork Co., Ltd., Tokyo, Japan

Filed Sep. 11, 1981, Ser. No. 301,412
Int. Cl.³ B65D *23/00*
U.S. Cl. 428—35 **12 Claims**



1. A bottle for a carbonated drink, which is formed by biaxial draw-blow molding of a polyester containing a surface active agent and being composed mainly of ethylene terephthalate units, wherein at least the barrel wall portion of the bottle is molecularly oriented biaxially so that the density is from 1.34 to 1.40 g/cm³ as measured at 20° C., and the surface active agent is distributed in the surface of the barrel wall portion so that the contact angle of the surface of the barrel wall portion to water is not larger than 76°, the surface active agent being incorporated in an amount of at least 10 ppm based on the polyester.

4,421,805

SLIP-RESISTANT SHIPPING SACKS

Randolph D. Prader, Fairport, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 29, 1982, Ser. No. 372,873
Int. Cl.³ B32B *5/12;* **B65D** *33/02*
U.S. Cl. 428—35 **10 Claims**

1. A product sack comprising an envelope of plastic film having at least one surface thereof at least partially coated with a thin layer of a slip-resistant thermoplastic polyamide resin.

4,421,806

LOW DENSITY RESIN SYSTEMS FOR IMPROVED FILAMENT-WOUND COMPOSITES USEFUL AS ROCKET MOTOR CASES

Burton S. Marks, Palo Alto; Richard E. Mauri, Mt. View, and Gazel W. Watsey, Livermore, all of Calif., assignors to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.

Filed Aug. 13, 1981, Ser. No. 292,648
Int. Cl.³ B32B *1/08;* **B64G** *1/20;* **F02K** *9/00*
U.S. Cl. 428—36 **49 Claims**

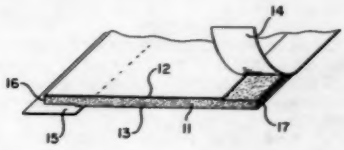
1. A cured filament-wound composite comprising fibers and resin, said resin characterized when cured by a density of less than 1.05 g/cc, and by a saturation water pick-up of less than 1% by weight, and when uncured by comprising an aromatic vinyl hydrocarbon monomer and as its major component poly(1,2-butadiene), carboxy-terminated poly(1,2-butadiene) or mixtures thereof and by having a viscosity at 45° C. of less than 2000 cps.

4,421,807

SHEET-LIKE SEALING WEB

Rüdiger Clausing, Neckargemünd, and Werner Schuster, Lobenfeld, both of Fed. Rep. of Germany, assignors to Teroson GmbH, Heidelberg, Fed. Rep. of Germany

Filed Feb. 24, 1982, Ser. No. 351,791
Claims priority, application Fed. Rep. of Germany, Feb. 26, 1981, 8105299[U]; Jul. 14, 1981, 8120644[U]
Int. Cl.³ B32B *3/06*
U.S. Cl. 428—41 **9 Claims**



1. A sheet-like sealing web for use in construction above and under ground comprising a layer of resilient elastic pressure sensitive adhesive and sealing composition having upper and lower surfaces disposed between respective upper and lower flexible layers covering a major portion of the area of said upper and lower surfaces with the longitudinal edges of said upper and lower surfaces being exposed, thereby forming first and second exposed sealing strips at opposite longitudinal edges of said upper and lower surfaces for overlap bonding of said web to adjacent identical webs and first and second fixation strips at the longitudinal edges of said upper and lower surfaces opposite said sealing strips for securing the web to a substrate or for bonding a cover material to the sealing web, said fixation strips being narrower than either of said sealing strips.

4,421,808

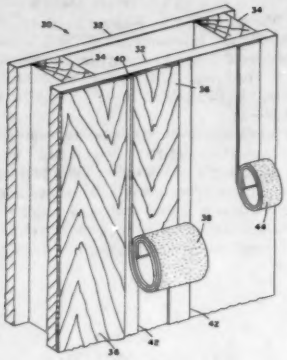
WOOD PLANK WALLCOVERING SYSTEM

Daniel A. Winkowski, Tonawanda, N.Y., assignor to National Gypsum Company, Dallas, Tex.

Continuation-in-part of Ser. No. 327,242, Dec. 3, 1981. This application Apr. 6, 1982, Ser. No. 365,991
Int. Cl.³ B32B *3/14, 3/16*
U.S. Cl. 428—55 **8 Claims**

1. A wallcovering combination for covering a single wall comprising a plurality of strips of wallcovering all having widths in the range of from about 3 inches to about 8 inches and all having a common decorative pattern, a pressure-sensitive adhesive on the back surface of said strips for adhering the strips to a wall in parallel spaced relationship one to another

and, as separate elements, a plurality of narrow tapes of from about ½ inch to about 1 inch and of contrasting appearance,



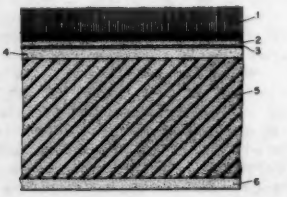
having a pressure-sensitive adhesive on the back surface of said tapes for adhering said tapes in the spaces between said wall-covering strips.

4,421,809

FLOOR MAT WITH FLOCK FIBERS ADHESIVELY BONDED ONTO A THIN POLYMERIC FILM

Steven S. Bish, Reading; Paul J. Sagel, Cincinnati, and Toan Trinh, Maineville, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Sep. 20, 1982, Ser. No. 420,426
Int. Cl.³ B05D *1/14*
U.S. Cl. 428—90 **11 Claims**



1. A floor mat comprising a thin, flexible polymeric film primary backing, a flocking adhesive, and assembled flock fibers, the fibers being bonded to the primary backing with the flocking adhesive; wherein the film is a water-impermeable, polymeric film, said film being dimensionally stable under flocking adhesive curing conditions; wherein the flexible polymeric film is selected from the group consisting of polycarbonate, nylon, polyester, polypropylene, and other suitable flexible films, said film having a thickness of at least 0.005 mm, and wherein said adhesive is coated on said film at a thickness of at least 0.1 mm prior to flocking, and wherein the fibers are flocked onto the film at a level of from about 1,000 to about 40,000 fibers/cm^2; the fibers having lengths of from 0.4 mm to about 10 mm and a denier of from 1.5 to about 80, and wherein the flocking adhesive is cured, and the cured adhesive has a water contact angle of from 0° to 70°.

4,421,810

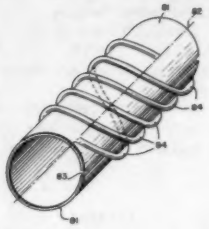
PERFORATED DRAINPIPE AND METHOD OF MAKING SAME

Ole-Bendt Rasmussen, 7, Topstykket, 3460 Birkeroed, Denmark

Division of Ser. No. 102,561, Dec. 11, 1979, Pat. No. 4,294,638, which is a continuation of Ser. No. 841,481, Oct. 12, 1977, abandoned, which is a continuation of Ser. No. 657,649, Feb. 12, 1976, abandoned. This application Aug. 13, 1980, Ser. No. 177,807

Claims priority, application United Kingdom, Feb. 12, 1975, 5971/75

Int. Cl.³ E02B *11/00*; B32B *29/02*; B65H *81/00*; B29C *19/00*
U.S. Cl. 428—109 **4 Claims**



1. A drainpipe comprising at least one sheet comprised of polymeric material, such sheet being in generally tubular configuration with at least one gap extending generally lengthwise therealong and defined by adjacent sheet edges slightly spaced apart from one another, and wound helically around the exterior periphery of said tubular sheet configuration and bridging said gap at least one ribbon comprised of polymeric material, such ribbon being bonded to the sheet configuration and serving to reinforce and shape the same.

3. A method of making a drainpipe which comprises forming an elongated sheet comprised of polymeric material into a tubular configuration with a gap extending generally lengthwise therealong defined by slightly spaced apart adjacent sheet edges, and applying helically around the exterior periphery of the thus-formed sheet and bridging said gap at least one ribbon comprised of polymeric material and bonded to the sheet surface to reinforce and shape the same.

4,421,811

METHOD OF MANUFACTURING DOUBLE LAYER ATTENUATION PANEL WITH TWO LAYERS OF LINEAR TYPE MATERIAL

Philip M. Rose, Chula Vista, and Frank J. Riel, San Diego, both of Calif., assignors to Rohr Industries, Inc., Chula Vista, Calif.

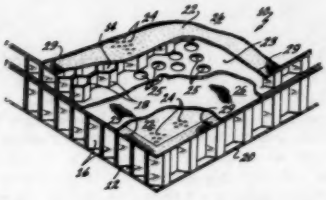
Filed Dec. 21, 1979, Ser. No. 106,146
The portion of the term of this patent subsequent to Oct. 13, 1998, has been disclaimed.
Int. Cl.³ B32B *3/12*; E04B *1/82*
U.S. Cl. 428—116 **6 Claims**

1. A method of manufacturing adhesively bonded acoustic attenuation structure, the structural components comprising first and second honeycomb cores with a multiplicity of endwise directed cells, an imperforate facing sheet, a first, second and third perforated sheets, the third perforated sheet having perforations of a larger cross-section than the first and second perforated sheets, a first and second thin sheet of porous fibrous material, said method comprising the steps of:

(a) cleaning the components to be assembled into said acoustical attenuation structure;

(b) applying a solvent base first adhesive covering to one surface of each of said first and second perforated sheets for bonding thereto one of said first and second thin sheets of porous fibrous material;

(c) removing the solvent from said solvent base first adhesive;
(d) stacking said first perforated sheet with said first thin sheet of porous fibrous material and said second perforated sheet with said second thin sheet of porous fibrous material, applying a positive pressure between the components of each stack and curing said first adhesive;
(e) applying a covering of a maskant material to the perforation exposed surface of the now combined perforate sheets and thin sheets of porous fibrous material;
(f) applying an anti-wetting solution to the fibers of the thin sheets of porous fibrous material and the adjacent attached surface of maskant material covered perforated sheets;
(g) removing the covering of maskant of step (e);
(h) applying a layer of a second adhesive on one surface of the imperforate sheet, the perforated surfaces of the combined first and second perforated sheets and porous fibrous material and both surfaces of the third perforated sheet; and



(i) stacking the first honeycomb core adjacent the adhesive applied surface of the imperforate sheet, the perforated sheet and first porous fibrous material adjacent the remaining open surface of the first honeycomb core, the third perforated sheet adjacent the porous fibrous surface of the combined first perforated sheet and first porous fibrous material, the second honeycomb core adjacent the third perforated sheet and the perforated surface of the com bined second perforated sheet and second porous fibrous material adjacent the remaining open surface of the second honeycomb core, applying a positive pressure between the outer components toward the center and curing the second adhesive.

4,421,812

METHOD OF MAKING A BONDED CORRUGATED NONWOVEN FABRIC AND PRODUCT MADE THEREBY

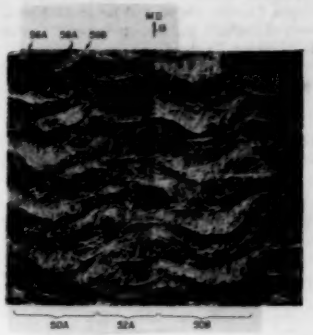
Derek Plant, Rannemede, N.J., assignor to Scott Paper Company, Philadelphia, Pa.

Division of Ser. No. 260,507, May 4, 1981. This application Jul. 6, 1982, Ser. No. 395,741

Int. Cl.³ B32B 3/26, 33/00

U.S. Cl. 428—152 **18 Claims**

1. A corrugated, nonwoven, creped web consisting primarily of thermoplastic fibers, said creped web having been compacted in a machine direction of the web by at least about 30%, the creped web having bonds extending through portions of the web, creping folds in the cross machine direction, and



having ridges consisting predominately of unbonded fibers and extending in the machine direction of the web.

4,421,813

COVERSTOCK FABRICS

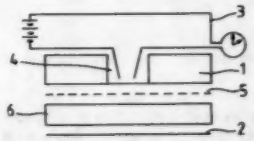
Graham Athey, Harrogate, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Jun. 15, 1981, Ser. No. 273,687

Claims priority, application United Kingdom, Jul. 10, 1980, 8022562

Int. Cl.³ B32B 3/00

U.S. Cl. 428—195 **6 Claims**



1. A coverstock fabric comprising an area-bonded nonwoven fabric containing a plurality of homofilament staple fibres comprising polyethylene terephthalate and a plurality of heterofilament staple fibres comprising a core of polyethylene terephthalate and a sheath of polyethylene isophthalate/-polyethylene terephthalate copolymer, the fabric having a soakthrough less than 3.5 seconds, a re-wet moisture less than 0.2 grams and a K factor less than 0.6.

4,421,814

STRIPPABLE RESISTS

John R. Piazza, Hopewell, N.J., assignor to Western Electric Co., Inc., New York, N.Y.

Continuation of Ser. No. 178,321, Aug. 15, 1980, abandoned, which is a division of Ser. No. 29,951, Apr. 13, 1979, Pat. No. 4,254,163. This application Mar. 29, 1982, Ser. No. 362,949

Int. Cl.³ C23F 1/02

U.S. Cl. 428—195 **2 Claims**

1. A thermographic printed strippable resist comprises a hydrophobic combination of a solvent-free, tacky, non-dryable low molecular weight liquid resin ink fused with a compatible powdered resin wherein said ink is a primary plasticizer for said powdered resin and both said ink and said powdered resin are polyester polymers, and wherein said resist forms a raised pattern on a substrate and is resistant to attack by metal etching and plating solutions and to scratching.

4,421,815
FIBROUS COMPOSITE MATERIALS AND THE PRODUCTION AND USE THEREOF

Peter J. Briggs, Cheadle Hume, and Kevin McAloon, Appleton Thorn, both of England, assignors to Imperial Chemical Industries PLC, London, England

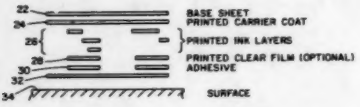
Filed Jul. 7, 1981, Ser. No. 281,106
Claims priority, application United Kingdom, Jul. 11, 1980, 8022713
Int. Cl.³ B32B 27/14, 7/02; D21D 3/00
U.S. Cl. 428—198 17 Claims

1. A fibrous composite material in the form of a three-dimensional block comprising a nonwoven mass of combustible fibers and vermiculite lamellae obtained by chemical delamination of vermiculite and having a thickness of less than 0.5 micron, the fibers comprising at least 15% by weight of the block and being bonded together by the vermiculite at their points of contact.

4,421,816
DRY TRANSFER DECAL AND METHOD OF MANUFACTURE

Raymond M. Arnold, Chicago, Ill., assignor to Advanced Graphic Technology, Chicago, Ill.

Filed Nov. 18, 1981, Ser. No. 322,596
Int. Cl.³ B32B 3/18; B41M 3/12
U.S. Cl. 428—202 12 Claims



1. A pressure sensitive, dry transfer decal comprising, in combination:

a base sheet;

a printed carrier coat of cross linked polymeric material on the base sheet having an extent of coverage on the base sheet of a complete image on the base sheet, said carrier coat being releasable from the base sheet;

at least one layer of printed ink on the carrier coat defining at least a portion of the image;

a second coat of cross linked polymeric material over the printed ink layer; and

a pressure sensitive adhesive layer over said second coat and carrier coat and substantially coextensive with the carrier coat for pressure application of the decal to a surface.

4,421,817
METHOD FOR MAKING PRINTABLE SELF-ADHESIVE TAPES AND THE SELF-ADHESIVE TAPES OBTANED THEREBY

Felice Pina, Via Poliziano, 12, Milano, and Graziano Galli, Via Vitruvio, 31, Formia (Latina), both of Italy

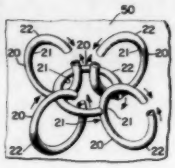
Filed Jan. 25, 1982, Ser. No. 342,598
Int. Cl.³ B32B 3/00; B05D 1/00; C09J 7/02
U.S. Cl. 428—207 7 Claims

1. A self-adhesive printed tape consisting of a film of polypropylene, an adhesive layer applied to one surface of said film and an antiadhesive lacquer applied on the other surface of said film, said antiadhesive layer being in the amount of 0.5–1.5 g/m² of said tape and being one member selected from the group consisting of acrylic and methacrylic resins, polyurethane resins, polyamide copolymers, and being printed on.

4,421,818
ARTICULATED FABRIC FORMED BY SELF-ASSEMBLING FIBERS

Edward F. Leonard, Bronxville, N.Y., assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Apr. 12, 1982, Ser. No. 367,203
Int. Cl.³ B32B 17/04; D04H 1/58
U.S. Cl. 428—222 7 Claims

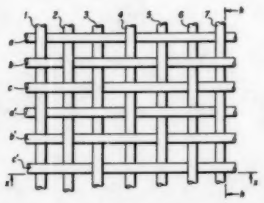


1. A patterned, nonwoven, articulated fabric exhibiting a substantially uniform texture and comprised of a multiplicity of synthetic fiber elements cut to predeterined lengths, the opposing free ends of each of said synthetic fiber elements being permanently joined to one another in a direct abutting relationship to form substantially continuous loops of predetermined diameter, said loops being interlocked with one another in a predetermined pattern, yet remaining free to articulate with respect to one another.

4,421,819
WEAR RESISTANT PAPER MACHINE FABRIC

Samuel M. Baker, Carleton Pl., Canada, assignor to JWI Ltd., Ontario, Canada

Continuation-in-part of Ser. No. 351,492, Feb. 23, 1982, abandoned. This application Sep. 30, 1982, Ser. No. 430,698
Int. Cl.³ B01D 39/08; D03D 15/00, 15/12; D21F 7/08
U.S. Cl. 428—229 5 Claims



1. A heat set paper making fabric woven of machine direction and cross-machine direction thermoplastic polymer yarns, wherein at least a portion of its wear resisting surface is composed of cross-linked high density high molecular weight polyethylene.

4. A monofilament for use in a paper making fabric said monofilament being composed of cross-linked high density high molecular weight polyethylene.

5. A monofilament for use in a paper making fabric, said monofilament being composed of a core material having desirable mechanical properties, said core being coated with cross-linked high density high molecular weight polyethylene.

4,421,820

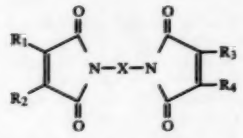
ELASTOMER-MODIFIED PHOSPHORUS-CONTAINING IMIDE RESINS

Indra K. Varma, New Delhi, India; George M. Fohlen, Millbrae, and John A. Parker, Los Altos, both of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Nov. 15, 1982, Ser. No. 441,899
Int. Cl.³ C08K 3/04, 3/40; B32B 7/00; D03D 3/00
U.S. Cl. 428—246 9 Claims

1. A thermosetting phosphorus-containing imide resin comprising the reaction product of

(1) a phosphine oxide moiety containing N,N'-bisimide of an unsaturated dicarboxylic acid of the formula (I)



(I)

wherein R_1, R_2, R_3 and R_4, which may be the same or different, each represents a hydrogen atom, a lower alkyl group or a halogen atom, and X is a divalent aromatic group containing a phosphine oxide moiety;

with

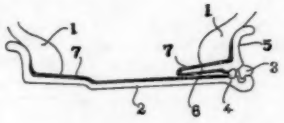
(2) a low molecular weight di(amino group-terminated) elastomer wherein the amount of said elastomer to the weight of said N,N'-bisimide of the formula (I) ranges from about 3% to about 10% by weight.

4,421,821

CORROSION RESISTANT TIRE RIM

Hideyuki Matsubara, Takarazuka; Ikutaka Kosugi, Kyoto, and Chiaki Tsukamoto, Ibaragi, all of Japan, assignors to The Toyo Rubber Industry Company, Limited, Osaka, Japan

Filed Dec. 21, 1981, Ser. No. 333,183
Claims priority, application Japan, Dec. 25, 1980, 55-186755
Int. Cl.³ B32B 5/16; B60B 21/00
U.S. Cl. 428—323 8 Claims



1. A tire rim having a 100–1000μ thick coating thereon of a composition containing a resin selected from the group consisting of an unsaturated thermosetting polyester resin and an epoxy resin and 10–100 weight parts of a chemically resistant flake filler having a Tyler mesh size of 30–325 per 100 weight parts of the resin.

4,421,822

ULTRAVIOLET POLYMERIZATION OF ACRYLATE MONOMERS USING OXIDIZABLE TIN COMPOUNDS

Dennis L. Levens, Hudson, Wis., assignor to Minnesota Mining and Manufacturing Co., St. Paul, Minn.

Division of Ser. No. 68,109, Aug. 20, 1979, Pat. No. 4,303,485.
This application Nov. 27, 1981, Ser. No. 325,503
Int. Cl.³ C09U 7/02
U.S. Cl. 428—343 7 Claims

1. Pressure-sensitive adhesive tape comprising a backing member and a photopolymerized pressure-sensitive adhesive coating of a mixture comprising by weight

(a) 100 parts of a composition which is polymerizable to a pressure-sensitive adhesive state and consists of 50–100 parts of one or both of alkyl acrylate and alkyl methacrylate and 0–50 parts of copolymerizable monoethylenically unsaturated monomer,

(b) oxidizable tin salt dissolved in composition (a) in an amount providing at least 0.01 part of tin, and

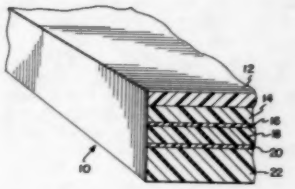
(c) addition-polymerization photoinitiator which is activatable by ultraviolet radiation and is dissolved in composition (a) in an amount providing about 0.01–5 parts of the photoinitiator.

4,421,823

FLEXIBLE WRAPPING MATERIAL AND METHOD OF MANUFACTURE

Henry J. Theisen, New London, and Willard H. Gehrke, Appleton, both of Wis., assignors to Curwood, Inc., New London, Wis.

Filed Jun. 1, 1982, Ser. No. 383,754
Int. Cl.³ B32B 27/06; B29C 19/00; B33B 27/08
U.S. Cl. 428—349 12 Claims



1. A film laminate of flexible, heat-sealable wrapping material, particularly suitable for use in the packaging of products which are to be maintained in hermetically sealed relationship to the atmosphere, comprising a first outer layer of heat-set, biaxially oriented polymeric material bonded on its inner side to a layer of polymeric material which is sandwiched between said outer layer and a layer of oxygen barrier polymer, adapted to provide a barrier against the migration of oxygen through the laminate, a layer of biaxially oriented polypropylene disposed between said layer of oxygen barrier polymer and a layer of special grease-resistant polymer bonding, without the use of a solvent, said layer of biaxially oriented polypropylene to an inner layer of heat-sealable polymeric material having a lower melting point than said outer layer whereby said layer of special grease-resistant polymer is resistant to food oils and greases and is selected from the group consisting of polyethylene, copolymers of vinyl acetate having a vinyl acetate content of approximately 12 percent or less, copolymers of ethylene acrylic acid, ethylene-vinyl acetate terpolymers, and ionomers.

4,421,824

PROCESS FOR RECONDITIONING OF CURRENCY AND CURRENCY

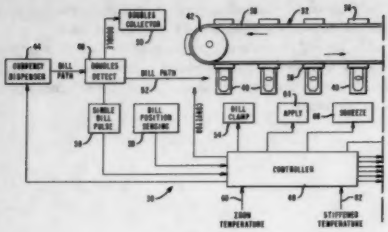
Desh B. Gupta, Dayton, and Robert H. Granzow, Miamisburg, both of Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Nov. 30, 1981, Ser. No. 325,702
Int. Cl.³ B32B 3/00
U.S. Cl. 428—211 13 Claims

1. A process for reconditioning used paper currency which

has become worn and unsuitable for further use in circulation as a medium of exchange comprising the following steps:

a. applying a stiffening composition to said currency;



b. pressing said currency to remove excess stiffening composition therefrom; and

c. drying said currency.

4,421,825

PAPERBOARD COATED TO MINIMIZE BROWNING

George M. Seiter, Minneapolis, Minn., assignor to Champion International Corporation, Stamford, Conn.

Continuation of Ser. No. 334,586, Dec. 28, 1981, abandoned. This application May 2, 1983, Ser. No. 487,711

Int. Cl.[3] B32B *23/00, 23/08*

U.S. Cl. 428—332 10 Claims

1. A paperboard product resistant to browning at temperatures of up to about 205° C., said product comprising a paperboard substrate coated on at least one surface thereof with a plurality of distinct coatings including a first coating comprising titanium dioxide and a solution having from about 5 to 15 weight percent acrylic copolymer, said titanium dioxide being present in said first coating in amounts ranging from about 15 to about 35 weight percent of the acrylic copolymer in the first coating, and one or more overcoatings of a clear acrylic copolymer which is substantially free of titanium dioxide wherein the first coating and the one or more overcoatings have a combined thickness totaling about 0.20 mils.

4,421,826

POLYURETHANE POLYMER AMINE SALT AS A DYEING AID, PARTICULARLY FOR POLYOLEFIN FIBERS

John L. Ohlson, Bedford, and Irving E. Isgur, Framingham, both of Mass., assignors to W. R. Grace & Co., Cambridge, Mass.

Continuation-in-part of Ser. No. 147,781, May 8, 1980, abandoned. This application Apr. 15, 1982, Ser. No. 361,317

Int. Cl.[3] B05D *5/04;* C09B *65/00;* D06M *15/12;* D06P *3/79*

U.S. Cl. 428—394 18 Claims

1. A process of treating a synthetic fiber comprising a polyolefin to impart improved dyeing properties thereto which comprises treating said synthetic fiber with a waterborne hydrophilic polyurethane polymer amine salt, said amine salt being prepared by a process comprising the steps of:

(a) reacting an isocyanate capped hydrophilic polyol prepolymer comprising a mixture of from about 2.9 to about 50% by weight of said mixture of an isocyanate capped polyol having a hydroxyl functionality in the range of 3 to 8 prior to capping and from about 97.1 to about 50% by weight of said mixture of an isocyanate capped hydrophilic polyoxyethylene diol having an ethylene oxide content of at least 40 mole percent with from about 0.7 to about 1.2 equivalents of an oxime to block substantially all of the isocyanate groups of said prepolymer and provide an oxime blocked prepolymer;

(b) reacting said oxime blocked prepolymer with a polyfunctional amine containing at least 2 primary amine functional groups to form an amine reaction product; and

(c) supplying an acid and water to the reaction mixture of (b) after an increase in viscosity has occurred and prior to the completion of the reaction of said polyfunctional amine and oxime blocked prepolymer to form said waterborne polyurethane polymer amine salt, said water and said acid being added to said reaction mixture separately or as an aqueous acid.

18. A treated fiber produced by the process of claim 1.

4,421,827

COMPOSITES AND METHODS FOR PROVIDING METAL CLAD ARTICLES AND ARTICLES PRODUCED

Cecil L. Phillips, Boughton, England, assignor to Scott Bader Company Limited, Great Britain

Filed Jan. 18, 1982, Ser. No. 340,405

Int. Cl.[3] B29D *9/08;* B29H *9/00;* B32B *15/08*

U.S. Cl. 428—418 16 Claims

1. A composite for providing a rigid metal clad article of thermosetting resin which composite includes a metal facing, a layer of adhesive material on the metal facing and, laid on the layer of adhesive material, an uncured curable thermosetting resin, the layer of adhesive material consisting essentially of a fully precured thermosetting or a thermoplastics material and being capable of adhesion to the metal facing and to the thermosetting resin at least upon curing of said uncured resin to form an adhesive bond with both the metal facing and the cured curable thermosetting resin.

11. A method of forming a rigid metal clad article which includes the steps of applying to a metal facing a layer consisting essentially of thermosetting or thermoplastics adhesive material capable of adhesion to the metal facing, bonding the said layer of adhesive material to the metal facing, which bonding is effected, when the adhesive material is a thermoplastics material, by heating the thermoplastics material and, when the adhesive material is a thermosetting material, by fully curing the thermosetting material, laying up on said layer of adhesive material an uncured curable thermosetting resin and curing the said curable thermosetting resin thereby bonding the adhesive material to the resin to provide the said metal clad article, which step of curing the said curable thermosetting resin is, when the adhesive material is a thermosetting material, carried out after the said curing of the thermosetting material.

4,421,828

STEEL SHEET CARRYING A PROTECTIVE LAYER AND PROCESS FOR PRODUCING SUCH A SHEET

Raymond Alloue, and Claude Mergey, both of Ville d'Avray, France, assignors to Carnaud S.A., Boulogne, France

Filed Sep. 8, 1980, Ser. No. 184,863

Claims priority, application France, Sep. 6, 1979, 79 22322

Int. Cl.[3] B32B *15/18;* C25D *5/10*

U.S. Cl. 428—629 9 Claims

1. A process for the production from mild steel sheets of a steel sheet carrying a protective layer suitable for the manufacture of metal containers, in particular food cans, the protected steel sheet possessing an electrical contact resistance which is lower than 100×10^{-5} ohms, so as to permit roller spot welding during the manufacture of said containers, which process includes the steps of:

(a) depositing on the surface of the metal sheet a layer of tin in an amount of from 0.1 to 1.05 g/m^2 of the surface area of the metal sheet to form a layer of tin which is unalloyed to the steel, and then

(b) electrolytically depositing a layer of chromium metal and chromium oxide on said unalloyed tin layer the said layer being deposited so that the said layer contains at least 5 micrograms per square centimeter of the surface area of the metal sheet (5 $\mu g/cm^2$) of metallic chromium and from 0.6 to 2.5 $\mu g/cm^2$ of chromium in oxidized form.

8. A steel sheet carrying a protective layer and being suitable for the manufacture of metal containers, in particular food cans, the protected steel sheet having an electrical contact resistance which is lower than 100×10^{-5} ohms, so as to permit

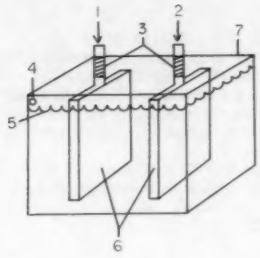
roller spot welding during the manufacture of the containers, the steel sheet comprising a sheet of mild steel having a layer of tin deposited on the surface of the sheet, in an amount of from 1.0 to 1.05 g/m^2, the tin layer not being alloyed with the steel, and a layer of metallic chromium and chromium oxide deposited on the resultant tin-coated metal sheet, the said layer containing at least 5 micrograms per square centimeter of metallic chromium (5 μg/cm^2) and from 0.6 to 2.5 μg/cm^2 of chromium in oxidized form.

4,421,829

HYDROGEN AZIDE-OXYGEN FUEL CELL

Robert C. Bohannon, 3392 W. Aksarben Ave., Littleton, Colo. 80123

Filed Aug. 2, 1982, Ser. No. 404,141
Int. Cl.^{3} H01M *8/22*
U.S. Cl. 429—15 **1 Claim**



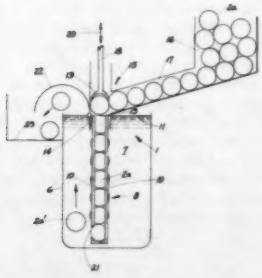
1. A method of operation of a fuel cell comprising a cell housing, a catalytic fuel electrode, a catalytic oxidant electrode and an electrolyte, said method comprising supplying an electrolyte solution containing hydrogen azide to said fuel electrode and an oxygen containing gas to said oxidant electrode.

4,421,830

BATTERY HAVING REPLACEABLE ELECTRODES

Richard T. Schneider, 3550 NW. 33rd Pl., Gainesville, Fla. 32605, and Frederick A. Hauck, 2501 Carew Tower, Cincinnati, Ohio 45202

Filed Jun. 4, 1982, Ser. No. 384,914
Int. Cl.^{3} H01M *10/28*
U.S. Cl. 429—49 **19 Claims**



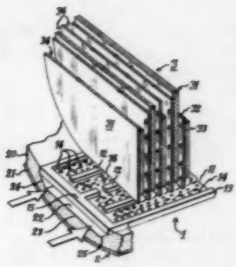
1. A battery having replaceable electrodes including an anode and a cathode, a tank holding a quantity of liquid electrolyte solution, a plurality of solid shaped anodic electrodes each having an outer surface comprising an anodic material, a plurality of solid shaped cathodic electrodes each having an outer surface comprising a cathodic material, said electrodes being configured to be bouyant in said electrolyte solution, means for immersing at least some of said electrodes in the electrolyte solution comprising anode guide means making electrical contact with the outer surfaces of the immersed anodic electrodes and electrically connected to the battery anode, and cathode guide means making electrical contact with the outer surfaces of the immersed cathodic electrodes and electrically connected to the battery cathode, and means for replacing individual ones of said electrodes.

4,421,831

BATTERY FLOW RESTRICTOR

Roger Garcia, Jr., Pittsfield, Mass., assignor to General Electric Company, Schenectady, N.Y.

Filed Jul. 12, 1982, Ser. No. 397,087
Int. Cl.^{3} H01M *2/40*
U.S. Cl. 429—70 **10 Claims**



1. In a bipolar primary battery having a multiplicity of closely spaced parallel battery plates defining a plurality of electrolytic cells, a casing surrounding the cells and channels in said casing for circulation of electrolyte to and from the cells and to and from other components of an electrolyte management system, the improvement wherein:

one said channel formed in said casing constitutes an intake raceway for conducting electrolyte past the edges of said plates in a direction relatively normal to said plates for delivery of electrolyte to all said cells; and

a flow restrictor interposed between said raceway and said cells for controlling the flow of electrolyte from said raceway to said cells to provide for an equalized flow of electrolyte through all cells, said flow restrictor being primarily a barrier but having passages therethrough to permit a limited distributed flow of electrolyte and to cause a pressure drop, both as predetermined to equalize flow among said cells.

4,421,832

ELECTROCHEMICAL CELL

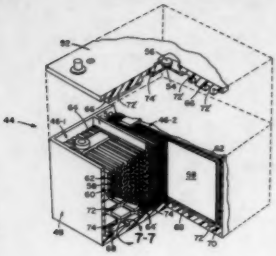
Toshio Uba, Denver, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Filed Aug. 24, 1981, Ser. No. 295,479
Int. Cl.^{3} H01M *2/36, 6/32*
U.S. Cl. 429—72 **16 Claims**

1. In an electrochemical cell of the limited electrolyte type having a cell pack comprised of absorbent separator interleaved and compressed between positive and negative plates, an electrolyte substantially fully absorbed within the separator and plates, and a container comprised of a jar having an opening and a lid closing said opening, the container encasing the cell pack and having a substantially planar end wall portion in substantial abutting contact with an edge of the cell pack, the improvement comprising:

channel means formed at the interface between said edge of the cell pack and the abutting end wall portion of the container, providing at least one passageway promoting along the extent of said channel means, the substantially

uniform distribution of electrolyte within the cell pack at least during filling of the cell with the electrolyte; and



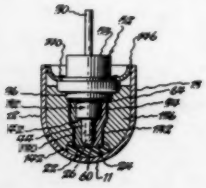
a substantially unrestricted path interconnecting the jar opening with the channel means insuring effective distribution of electrolyte to said interface.

4,421,833

LITHIUM-HALOGEN CELL

Robert A. Zayatz, North Tonawanda, N.Y., assignor to Wilson Greatbatch Ltd., Clarence, N.Y.

Division of Ser. No. 222,498, Jan. 5, 1981. This application Apr. 15, 1982, Ser. No. 368,865
Int. Cl.³ H01M 4/36
U.S. Cl. 429—101 **10 Claims**



1. A lithium-halogen cell comprising:

(a) a casing of electrically conducting material;

(b) anode means positioned within said casing and comprising an anode electrical conductor sandwiched between a pair of lithium plates defining substantially oppositely directed lithium outer surfaces terminating in a peripheral lithium edge, a major portion of the length of said peripheral edge being uncovered and exposed;

(c) said anode electrical conductor extending through said casing;

(d) means for sealing said conductor from the remainder of said cell;

(e) cathode means comprising halogen-containing cathode material within said casing and in operative contact with said outer surfaces of said lithium plates and with said peripheral lithium edge and with a major portion of the surface of said casing in a manner such that said casing serves as a cathode current collector; and

(f) said sealing means shielding said anode conductor from said halogen-containing material and electrically insulating said conductor from said casing;

(g) whereby an electrical potential difference exits between said conductor and said casing during operation of said cell.

4,421,834

LIQUID CATHODE CELLS WITH A GLASS FIBER SEPARATOR

Ronald L. Zupancic, Parma Heights, Ohio, assignor to Union Carbide Corporation, Danbury, Conn.

Filed Jul. 1, 1982, Ser. No. 394,298
Int. Cl.³ H01M 4/36
U.S. Cl. 429—105 **11 Claims**

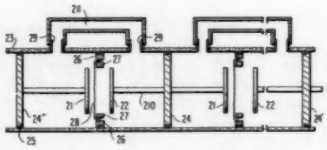
1. A nonaqueous cell employing a liquid cathode containing a solute, an active anode, a cathode collector, and a separator disposed between said anode and said cathode collector; the improvement wherein the separator comprises a uniform mixture of 85 to 95 weight percent glass fibers and 15 to 5 weight percent binder, said glass fibers being $\frac{1}{8}$ to $\frac{1}{4}$ inch in length and 2 to 8 microns in diameter, and wherein at least 90 percent of the glass fibers are within 20 percent of the average length of the glass fibers and within 20 percent of the average diameter of the glass fibers.

4,421,835

STORAGE OF ELECTRICAL ENERGY WITH TIN ELECTRODE SYSTEM, STORAGE APPARATUS, AND METHOD OF FORMING SUCH APPARATUS

Joost Manassen; Gary Hodes, and David Cahen, all of Rehovot, Israel, assignors to Yeda Research and Development Co., Ltd., Rehovot, Israel

Filed Apr. 22, 1981, Ser. No. 256,547
Claims priority, application Israel, Apr. 25, 1980, 59925
Int. Cl.³ H01M 6/36
U.S. Cl. 429—111 **28 Claims**



1. A system for storing electrical energy comprising a plurality of individual cells positioned in a container, each cell comprising a storage compartment containing a storage electrode comprising tin, and further containing an alkaline sulfide solution containing tin in a soluble form, said storage compartment being at least partially enclosed by a membrane, each of said cells further comprising a second compartment, said second compartment containing a second electrode and a polysulfide solution, said membrane separating said storage and said second compartments, wherein the membrane of each of said cells is free to move within said container while maintaining the separation between the compartments of each cell, thereby compensating for volume changes in said container.

3. The system as defined by claim 1 wherein said second electrode in said second compartment is a counterelectrode, and wherein said second compartment further comprises a semiconductor photoconversion electrode, said semiconductor photoconversion electrode being adapted to be electrically connected to said storage electrode.

4,421,836

METHOD FOR REPAIRING SILVER IMAGE GLASS PHOTOMASKS WITH Ni

Dennis S. Postupack, Natrona Heights, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 305,430, Sep. 25, 1981, Pat. No. 4,383,016. This application Nov. 3, 1982, Ser. No. 438,562
Int. Cl.³ G03F 5/00; G02B 5/22
U.S. Cl. 430—5 **1 Claim**

1. A patterned photomask article comprising a glass sub-

strate and a silver stained pattern wherein defects in said pattern are coated with a nickel coating of sufficient density to mask actinic radiation.

4,421,837

METHOD OF IMPROVING IMAGE SHARPNESS OF AN ELECTROPHOTOGRAPHIC PHOTOSENSITIVE PLATE

Yasuba Hiroshi, Jyoyou; Umeda Masahiro, Moriguchi, and Yuri Osamu, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Continuation of Ser. No. 740,723, Nov. 10, 1976, abandoned. This application Mar. 5, 1979, Ser. No. 17,534

Claims priority, application Japan, Nov. 12, 1975, 50-136499

Int. Cl.³ G03G *13/22*

U.S. Cl. 430—31 7 Claims

1. A method for permanently improving image sharpness of an electrophotographic photosensitive plate comprising an electrically conductive layer and a dye-sensitized photoconductive layer to be negatively charged in an electrophotographic process, the method comprising applying an ultraviolet light onto the surface of said dye-sensitized photoconductive layer before being negatively charged, for a time sufficient to cause dye sensitizers at or near the surface of said photoconductive layer to permanently lose their photosensitizing function.

4,421,838

PROCESSES FOR PREPARING PHOTOCONDUCTIVE ELEMENTS AND ELECTROPHOTOSENSITIVE MATERIALS

Keiji Takeda; Mitsuharu Nirasawa, and Masayoshi Nagata, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 102,806, Dec. 12, 1979, abandoned. This application Apr. 20, 1981, Ser. No. 255,391

Claims priority, application Japan, Dec. 13, 1978, 53-155267; Jul. 5, 1979, 54-85396

Int. Cl.³ G03G *5/08*

U.S. Cl. 430—58 48 Claims

1. In a process for preparing a photoconductive element comprising elemental selenium dispersed in a binder, the improvement which comprises chemically reducing an inorganic selenium compound in the presence of an insulating polymer.

4,421,839

HEAT-SENSITIVE AND PHOTOFIXING RECORDING SHEET WITH DIAZOSULFONATE AND ACIDIC COUPLING AGENT THEREFORE

Ryohei Takiguchi, Narashino, and Masayoshi Nagashima, Chigasaki, both of Japan, assignors to Dai Nippon Printing Co., Ltd. and Tokyo Shibaura Denki Kabushiki Kaisha, both of Tokyo, Japan

Continuation-in-part of Ser. No. 174,443, Aug. 1, 1980, abandoned. This application Mar. 3, 1982, Ser. No. 354,525

Claims priority, application Japan, Aug. 3, 1979, 54-107358; Aug. 3, 1979, 54-107359; Aug. 3, 1979, 54-107360; Aug. 3, 1979, 54-107361; Oct. 8, 1979, 54-128816; Oct. 8, 1979, 54-128817

Int. Cl.³ G03C *1/56, 1/58*

U.S. Cl. 430—164 6 Claims

1. A heat-sensitive recording sheet adapted for use in a recording process consisting in sequence of optical activation with a wavelength of more than 400 nm, heat-sensitive recording with a thermal energy of 0.4–10 w/1–3 msec per dot (260μ×130μ) and photofixing at a wavelength of 300–450 nm, wherein on at least one major surface of a sheet-like support body is formed a heat-sensitive recording layer consisting of:

a diazosulfonate;

an acidic coupling agent comprising an aromatic compound in which one or more —OH groups and one —COOH group are bonded to an aromatic ring; and

a member selected from the group consisting of thermosetting or thermoplastic resins having a glass transition point of 70°–150° C.

4,421,840

PHOTOPOLYMERIZABLE RECORDING MATERIAL CONTAINING A DIISOCYANATE MODIFIED NYLON BINDER

August Lehner, Roedersheim; Heinz U. Werther, Wachenheim; Dieter Naegele, Worms; Werner Lenz, Bad Durkheim; Moog-Jon Jun, Speyer; Horst Reimann, Worms, and Albrecht Eckell, Frankenthal, all of Fed. Rep. of Germany, assignors to Basf Aktiengesellschaft, Fed. Rep. of Germany

Filed Dec. 9, 1981, Ser. No. 329,111

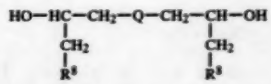
Claims priority, application Fed. Rep. of Germany, Dec. 13, 1980, 3047126

Int. Cl.³ G03C *1/78*

U.S. Cl. 430—273 5 Claims

1. A photopolymerizable recording material for the preparation of relief printing plates and photoresists comprising a base A and a photopolymerizable layer B, the photopolymerizable layer B comprising

(1) as the polymeric binder (B1), a substantially linear, high molecular weight, thermoplastic diisocyanate-modified nylon having a K value of from about 30 to 75 and which contains from 0.2 to 2.5% by weight based on the weight of the diisocyanate-modified nylon of quaternary and/or quaternizable nitrogen atoms and also contains from 0.01 to 2.5% by weight based on the weight of the diisocyanate-modified nylon of photopolymerizable double bonds in side branches, wherein said component (B1) has been prepared by reacting a nylon having two hydrogen atoms capable of reacting with isocyanates, with a diisocyanate, a tertiary nitrogen compound which is bifunctionally reactive with isocyanates, and a chain extender compound which has two hydrogen atoms capable of reacting with isocyanates and possesses olefinic double bonds in side branches, which chain extender compound is the reaction product of glycidol with acrylic or methacrylic acid or has the formula

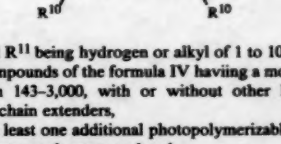


(IV)

where

R^8 is $CH_2{=}CR^9{-}CO{-}O{-}$, R^9 being hydrogen or methyl, and

Q is —O—, —O—$(CH_2)_m$—O, —O—$(CH_2{-}CH_2{-}O{-})_n$, —O—$(CHCH_3{-}CH_2{-}O{-})_p$, m, n and p being, independently of one another, integers of from 1 to 10, or a radical of the formula (V)



(V)

R^{10} and R^{11} being hydrogen or alkyl of 1 to 10 carbon atoms, said compounds of the formula IV having a molecular weight of from 143–3,000, with or without other low molecular weight chain extenders,

(2) at least one additional photopolymerizable ethylenically unsaturated compound and

(3) a photopolymerization initiator.

4,421,841
PHOTOSENSITIVE LITHOGRAPHIC PLATE WITH SULFONATE CONTAINING PHOTOSENSITIVE POLYESTER

Shigeki Shimizu, Atsugi, and Akinobu Oshima, Tokyo, both of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

Filed Jul. 14, 1982, Ser. No. 398,442

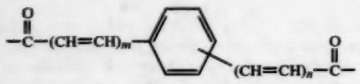
Claims priority, application Japan, Jul. 28, 1981, 56-118345; Apr. 5, 1982, 57-56183

Int. Cl.³ G03C *1/68;* **C08G** *18/00, 63/00, 69/00*

U.S. Cl. 430—285 **5 Claims**

1. A photosensitive lithographic plate having, on a substrate, a photosensitive layer comprising a photosensitive polyester containing at least (A):

(a) an aromatic dicarboxylic acid unit represented by the general formula:

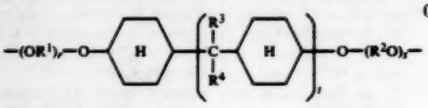


(I)

where m and n each represents an integer of 0 or 1, with at least one of them being 1,

(b) a dicarboxylic acid unit having a sulfonate group, and

(c) a diol unit represented by the general formula:



(II)

wherein

represents a hydrogenated benzene ring, R^1 and R^2 each represents an alkylene group of 2–4 carbon atoms, R^3 and R^4 each represents a hydrogen atom or an alkyl group of 1–6 carbon atoms, r and s each represents an integer of from 0 to 3 and t represents an integer of 0 or 1.

4,421,842
PROCESS FOR FORMING FILM OF FLUOROALKYL ACRYLATE POLYMER ON SUBSTRATE AND PROCESS FOR PREPARING PATTERNED RESIST FROM THE FILM

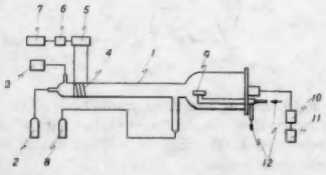
Shuzo Hattori; Shinzo Morita, both of Nagoya, and Tsuneo Fujii, Suita, all of Japan, assignors to Daikin Kogyo Co., Ltd., Osaka, Japan

Division of Ser. No. 310,407, Oct. 9, 1983, Pat. No. 4,382,985. This application Jan. 6, 1983, Ser. No. 455,909

Claims priority, application Japan, Oct. 11, 1980, 55-142198; Jun. 1, 1981, 56-84092; Jun. 1, 1981, 56-84093

Int. Cl.³ B05D *3/04, 7/24, 3/14*

U.S. Cl. 430—296 **1 Claim**



1. A process for forming a patterned resist film on a substrate which comprises (a) forming a film of a polymer on a substrate by polymerizing a fluoroalkyl acrylate having the following general formula:

$$R_fR^2OCOCR^1{=}CH_2$$

wherein R^1 is a C_1 to C_{15} straight or branched perfluoroalkyl group or a C_1 to C_{15} straight or branched perfluoroalkyl group in which at least one of the fluorine atoms is substituted by hydrogen atom and which has at least one fluorine atom, R^1 is hydrogen atom, methyl group, ethyl group or a halogen atom, and R^2 is a bivalent hydrocarbon group, by the action of an inert gas excited by glow discharge in the presence of a substrate, and (b) radiating electron beams to the film to form a pattern.

4,421,843
PROCESS FOR FORMING FILM OF FLUOROALKYL ACRYLATE POLYMER ON SUBSTRATE AND PROCESS FOR PREPARING PATTERNED RESIST FROM THE FILM

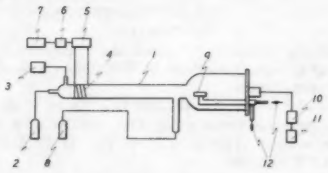
Shuzo Hattori; Shinzo Morita, both of Nagoya, and Tsuneo Fujii, Suita, all of Japan, assignors to Daikin Kogyo Co., Ltd., Osaka, Japan

Division of Ser. No. 310,407, Oct. 9, 1981, Pat. No. 4,382,985. This application Jan. 6, 1983, Ser. No. 455,910

Claims priority, application Japan, Oct. 11, 1980, 55-142198; Jun. 1, 1981, 56-84092; Jun. 1, 1981, 56-84093

Int. Cl.³ B05D *3/04, 7/24, 3/14*

U.S. Cl. 430—322 **4 Claims**



1. A process for forming a patterned resist film on a substrate which comprises (a) forming a film of a polymer on a substrate by polymerizing a fluoroalkyl acrylate having the following general formula:

$$R_fR^2OCOCR^1{=}CH_2$$

wherein R^1 is a C_1 to C_{15} straight or branched perfluoroalkyl group or a C_1 to C_{15} straight or branched perfluoroalkyl group in which at least one of the fluorine atoms is substituted by hydrogen atom and which has at least one fluorine atom, R^1 is hydrogen atom, methyl group, ethyl group or a halogen atom, and R^2 is a bivalent hydrocarbon group, by the action of an inert gas excited by flow discharge in the presence of a substrate, (b) radiating high energy rays to the film to form a latent pattern, and (c) developing the latent pattern.

4,421,844
PROCESS FOR THE PREPARATION OF RELIEF COPIES

Gerhard Buhr, Koenigstein, and Marie-Luise Geus, Wiesbaden, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Oct. 9, 1981, Ser. No. 310,276

Claims priority, application Fed. Rep. of Germany, Oct. 13, 1980, 3038605

Int. Cl.³ G03C *5/24;* **G03F** *7/00*

U.S. Cl. 430—326 **9 Claims**

1. A process for the preparation of relief copies, comprising the steps of:

imagewise irradiating a radiation-sensitive copying material comprising a layer support and a radiation-sensitive layer comprising

(a) a compound which upon irradiation splits off acid, and

(b) a compound possessing at least one acid-cleavable

C—O—C group comprising an orthocarboxylic acid ester grouping or a carboxylic amide acetal grouping, or an organic polymeric compound containing recurring acetal or ketal groupings in the main chain and whose solubility in a developer liquid is increased by the action of an acid, wherein said polymeric compound is produced by reaction of an aldehyde and/or ketone with a bivalent alcohol and wherein each alpha-carbon atom of the alcohol constituent of the acetal or ketal groupings is aliphatic;

after said irradiating step and before developing, heating the imagewise irradiated copying material to a temperature in the range of between 65° and 90° C. for a period of time sufficient to produce an increase in radiation sensitivity of the radiation-sensitive layer; and

washing out the irradiated layer areas with a developer, after said heating step.

4,421,845

SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Morito Uemura, Hino; Kenichi Kishi, Sagamihara; Satoshi Nakagawa, Hino; Shuji Kida, and Hiroshi Sugita, both of Hachioji, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Japan

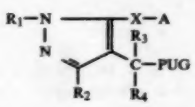
Filed Mar. 11, 1982, Ser. No. 357,149

Claims priority, application Japan, Mar. 19, 1981, 56-39766

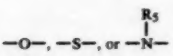
Int. Cl.³ G03C *1/40*

U.S. Cl. 430—544 **6 Claims**

1. A silver halide photographic light-sensitive material which comprises at least one of those pyrazole compounds represented by the following general formula:



wherein A is a group which can be eliminated in a photographic process condition; X is



wherein R_5 is a hydrogen atom or an alkyl, an aryl, an acyl or a sulfone group, which R_5 group may combine together with R_1 to form a condensed ring; R_1 is a hydrogen atom or an alkyl, an aryl, an acyl, a sulfone, an alkoxy, or a heterocyclic residue; R_2 is a hydrogen atom or an alkyl, an aryl, an alkoxy, an amino, an acid amide, a sulfonamide, a carboxyl, an alkoxycarbonyl, a carbamoyl, a cyano, or a halogenated alkyl group, R_3 and R_4 each is a hydrogen atom or an alkyl or an aryl group; and PUG is a photographically useful group which is released after elimination of the A group in a photographic processing condition and which has a hetero atom directly combined with the carbon substituted in the fourth position of the pyrazole nucleus.

4,421,846

PHOTOGRAPHIC ELEMENT WITH REDUCIBLE METAL COMPLEX THAT RELEASES PHOTOGRAPHICALLY USEFUL COMPOUND

Satoru Ikeuchi, Hino; Masaru Kanbe, Hachioji; Jiro Takahashi, Hachioji; Ryuichiro Kobayashi, Hachioji; Shunji Suginaka, Tokyo, and Noboru Mizukura, Tsukui, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Dec. 23, 1981, Ser. No. 333,901

Claims priority, application Japan, Dec. 23, 1980, 55-183573

Int. Cl.³ G03C *5/54, 1/10, 1/40, 1/06*

U.S. Cl. 430—559 **17 Claims**

1. A photographic element comprising, a silver halide photosensitive emulsion layer on a support, said emulsion layer containing a metal complex having a plurality of ligands, said complex being non-diffusible, inert with respect to ligand exchange until reduced under alkaline conditions (hereinafter referred to as ligand exchange inert complex) and wherein said complex has at least one polydentate group having a photographically useful group which itself is diffusible when released from said complex, said photographically useful group being selected from the group consisting of a dye, a development inhibitor, an anti-foggant, a development accelerator, a silver halide solvent, a developing agent, a toning agent, a fixing agent, a hardening agent and a precursor thereof; said complex being capable of being activated, when reduced under alkaline conditions, to become labile with respect to ligand exchange (hereinafter referred to as ligand exchange liable complex) to release said dissusible photographically useful group.

4,421,847

PROCESS FOR THE CHAIN-LENGTHENING OF GELATINE BY PARTIAL HARDENING

Heinrich Jung, Leverkusen, and Ulrich Biskup, Cologne, both of Fed. Rep. of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 157,464, Jun. 9, 1980, abandoned. This application Dec. 11, 1981, Ser. No. 329,731

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1979, 2924035

Int. Cl.³ G03C *1/30*

U.S. Cl. 430—621 **13 Claims**

1. In a process for chain-lengthening gelatin for a photographic material by an agent or agents to provide increased molecular weight,

the steps comprising

preparing a gelatin solution containing from 5 to 35% by weight of gelatin,

contacting said gelatin solution for a period of 0.01 seconds to 10 minutes at 30° to 90° C. with 0.001 to 0.01 mole of an agent per 100 g of dry gelatin, said agent being capable of activating the carboxyl groups of the gelatin with the formation of reactive products causing cross-linking,

and thereby providing chain-lengthening of the molecules of the gelatin resulting in a change of the distribution of the molecular weight within said gelatin solution by producing intercaternary bonds and linear chain-lengthening to increase the molecular weight of the gelatin derivative and in the absence of decreasing triple helix formation,

said chain-lengthened gelatin solution being coatable into a layer on a support,

said chain-lengthening agent being capable of converting a photographic gelatin layer resistant to boiling after treatment of a 20μ thick dry gelatin layer with an aqueous solution of the agent at a concentration of 0.01 to 0.03 mole chain-lengthening agent per 100 g dry gelatin at a pH value of the moist gelatin layer of 5 to 7 at a temperature of 20° C.

4,421,848

METHOD OF DETECTING THE PRESENCE OF LIVE ORGANISMS IN SUBSTANCES

Gerald D. Whitlock, Wilton Rd., Malvern, Worcestershire WR14 3RG, England

Filed Mar. 30, 1981, Ser. No. 248,847

Claims priority, application United Kingdom, Apr. 15, 1980, 8012364

Int. Cl.³ C12M *1/34*; C12Q *1/04, 1/06, 1/66, 1/70*

U.S. Cl. 435—8 **11 Claims**

2. In a method of detecting the presence of live organisms in a substance employing the steps of disrupting said organisms by treatment of the substance so that certain constituents of said organisms are released, bringing said constituents into close relationship with a light-photon-producing reagent so

that photons of light are produced and detecting said photons of light, the improvement comprising the steps of: gently and completely mixing said organisms with said reagent prior to said organisms becoming suddenly disrupted by violent agitation so that each disruption of a live organism causes production of a burst of light photons and detecting the bursts of light photons.

4,421,849

METHOD FOR BIOLOGICAL SCREENING

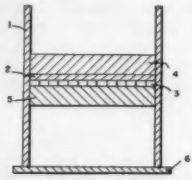
Eberhard Breuker, Rektenstrasse 10, Detmold, Fed. Rep. of Germany (D-4930)

Continuation-in-part of Ser. No. 176,006, Aug. 7, 1980, abandoned. This application Jun. 4, 1982, Ser. No. 385,116

Claims priority, application Fed. Rep. of Germany, Aug. 11, 1979, 2932694

Int. Cl.³ C12Q *1/18*

U.S. Cl. 435—32 **8 Claims**



1. A method for screening or identifying a microorganism comprising providing two microorganism nutrient medium layers in communication with and separated by a sterilizable membrane filter; implanting in one of said layers:

(a) a first unknown microorganism suspected of producing a substance effective by its reaction with a second known microorganism or enzyme detecting agent to identify said first microorganism, or

(b) a first known microorganism which produces a substance effective by its reaction with a second unknown microorganism to identify said second unknown microorganism;

implanting in the other layer said second microorganism or enzyme detecting agent, said membrane filter being impermeable to each of said microorganisms and enzyme detecting agent but permeable to said effective substance; causing said effective substance to be produced and diffused through said membrane filter, and observing the effect of said effective substance on said second microorganism or enzyme detecting agent.

4,421,850

IMMOBILIZATION OF ENZYMES

Michael J. Daniels, and Digby M. Farmer, both of Reading, England, assignors to Tate & Lyle Limited, England

Filed Feb. 24, 1981, Ser. No. 237,637

Claims priority, application United Kingdom, Feb. 26, 1980, 8006448

Int. Cl.³ C12P *1/00, 19/20;* C12N *11/00, 11/02*

U.S. Cl. 435—41 **18 Claims**

1. An immobilized enzyme product consisting essentially of particulate inert bone char carrying an immobilized cross-linked enzyme in the form of a gel, said gel consisting essentially of active immobilized enzyme and 50–90% water, at least a portion of said gel being external to said bone char and said portion forming at least 3% by volume of said product, the bulk volume of said product being from 5 to 300% greater than the bulk volume of said bone char.

4,421,851

ANTITUMOR ANTIBIOTICS

Giuseppe Cassinelli, Pavia; Arpad Grein, Milan; Sergio Merli, Milan, and Giovanni Rivola, Milan, all of Italy, assignors to Farmitalia Carlo Erba S.p.A., Milan, Italy

Division of Ser. No. 94,671, Nov. 15, 1979, Pat. No. 4,370,474. This application Nov. 16, 1981, Ser. No. 321,558

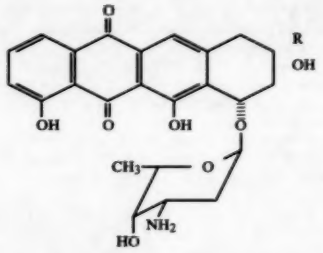
Claims priority, application United Kingdom, Nov. 21, 1978, 45434/78

Int. Cl.³ C12P *19/56;* C12N *1/14;* C12R *1/465*

U.S. Cl. 435—78 **6 Claims**

1. A biologically pure culture of the microorganism *Streptomyces peucetius* var. *aureus* ATCC 31428, said culture being capable of producing 11-deoxy-14-hydroxy-carminomycin, 11-deoxy-carminomycin and 11-deoxy-13-deoxo-carminomycin in recoverable quantities upon fermentation in an aqueous nutrient medium containing assimilable sources of carbon, nitrogen and inorganic substances.

2. A process for producing an antibiotic complex including a mixture of the compounds having the formula:



wherein R is CO—CH_2—OH, $COCH_3$, or CH_2—CH_3 and a salt thereof, said process comprising cultivating the microorganism *Streptomyces peucetius* var. *aureus* ATCC 31428, under aerobic conditions in an aqueous culture medium containing an assimilable source of carbon, an assimilable source of nitrogen and mineral salts and recovering said antibiotic complex from the culture medium.

4,421,852

PRODUCTION OF HIGH FRUCTOSE SYRUP FROM INULIN INVOLVING ULTRAFILTRATION

Ernst Hoehn, 128 Traverse Ave., Winnipeg, Manitoba, Canada (R2H 2G9); Curtis J. McKay, Apt. 424, 99 Dalhousie Dr., Winnipeg, Manitoba, Canada (R2G 2G5), and E. Donald Murray, 833 Kilkenny Dr., Winnipeg, Manitoba, Canada (R3T 4Y4)

Filed Aug. 9, 1982, Ser. No. 406,178

Claims priority, application Canada, Sep. 15, 1981, 385954

Int. Cl.³ C13D *3/16;* C13K *11/00;* C12P *19/14*

U.S. Cl. 435—99 **17 Claims**

1. A process for producing a syrup containing reducing sugars wherein fructose constitutes at least 60 wt% of the reducing sugars, which comprises:

extracting soluble substances from an inulin-containing naturally-occurring material with water to form an aqueous inulin solution containing low molecular weight nitrogen-containing organic species and minerals,

simultaneously concentrating said aqueous inulin solution and removing at least a substantial proportion of said low molecular weight nitrogen-containing organic species and minerals therefrom to form a concentrated inulin solution by a membrane technique which permits said lower molecular weight nitrogen-containing organic species and minerals to pass through the membrane while retaining said inulin in solution,

subjecting said concentrated inulin solution to enzymatic hydrolysis to form fructose and glucose from inulin and

any related fructans present in said concentrated inulin solution to produce a fructose solution containing unhydrolyzed and partially hydrolyzed higher molecular weight species,

removing at least a substantial proportion of said higher molecular weight species from said fructose solution to form a purified fructose solution containing reducing sugars of at least about 90 wt% of the dissolved material therein and wherein fructose constitutes at least about 60 wt% of said reducing sugars, said removal being effected by a membrane technique which permits fructose and glucose to pass therethrough to form said fructose solution while retaining said higher molecular weight species, and

evaporatively concentrating said purified fructose solution to a syrup of desired concentration.

4,421,853

FERMENTATIVE PREPARATION OF L-LEUCINE

Mark H. Updike, Baltimore, and Gary J. Calton, Elkridge, both of Md., assignors to W. R. Grace & Co., New York, N.Y.

Filed Jun. 16, 1982, Ser. No. 388,760

Int. Cl.³ C12P *13/06*; C12N *15/00*; C12R *1/13*

U.S. Cl. 435—116 **6 Claims**

1. A process for preparing L-leucine which comprises cultivating under aerobic conditions a mutant strain of Brevibacterium thiogenitalis resistant to an analogue of L-leucine selected from the group consisting of α-amino-β-hydroxyvaleric acid; methallylglycine; and β-hydroxyleucine, to yield a fermentation broth, accumulating from about 0.1 to about 6 grams/liter L-leucine in said fermentation broth, and recovering the accumulated L-leucine from said fermentation broth.

4,421,854

FERMENTATIVE PREPARATION OF L-LEUCINE

Mark H. Updike, Baltimore, and Gary J. Calton, Elkridge, both of Md., assignors to W. R. Grace & Co., New York, N.Y.

Filed Jun. 16, 1982, Ser. No. 388,901

Int. Cl.³ C12P *13/06*; C12N *15/00*; C12R *1/06*

U.S. Cl. 435—116 **10 Claims**

1. A process for preparing L-leucine which comprises cultivating under aerobic conditions a mutant strain of *Arthrobacter citreus* resistant to an analogue of L-leucine selected from the group consisting of α-amino-β-hydroxyvaleric acid; D-leucine; α-aminoisoamylsulfonic acid; norvaline; norleucine; methallylglycine; α-amino-β-chlorobutyric acid; valine; α-chloroleucine; isoleucine; β-hydroxynorleucine; β-hydroxyleucine; cyclopentene alanine; 3-cyclopentene-1-alanine; 2-amino-4-methylhexenoic acid; 5',5',5'trifluoroleucine, and 4-azaleucine, to yield a fermentation broth, accumulating from about 0.1 to about 8 grams/liter L-leucine in said fermentation broth, and recovering the accumulated L-leucine from said fermentation broth.

4,421,855

PRODUCTION OF ACRYLAMIDE USING IMMOBILIZED CELLS

Ichiro Watanabe; Keiichi Sakashita, both of Yokohama, and Yasuo Ogawa, Kawasaki, all of Japan, assignors to Nitto Chemical Industry Co., Ltd., Tokyo, Japan

Filed Aug. 14, 1981, Ser. No. 292,848

Claims priority, application Japan, Aug. 19, 1980, 55-113039

Int. Cl.³ C12P *13/02*; C12N *11/08, 11/04*

U.S. Cl. 435—129 **9 Claims**

1. A process for producing acrylamide from acrylonitrile in an aqueous medium by the action of a microorganism having nitrilasic activity immobilized with a polyacrylamide gel wherein the improvements comprise immobilizing the microorganism by the use of cationic acrylamide-based polymer gel comprising from 50 to 95% by weight acrylamide, from 1 to 50% by weight of at least one cationic ethylenically unsaturated monomer copolymerizable with acrylamide selected from the group consisting of dimethylaminoethyl methacrylate, diethylaminoethyl methacrylate, dimethyolaminopropylmethacrylamide, diethylaminopropylmethacrylamide, and quaternary salts thereof, and from 0.1 to 20% by weight of a cross-linking monomer, based on the total weight of the three monomers and using as said medium, an aqueous medium having a salt concentration of 0.1 weight percent or less.

4,421,856

FERMENTABLE SUGAR FROM THE HYDROLYSIS OF CARBOHYDRATE POLYMER

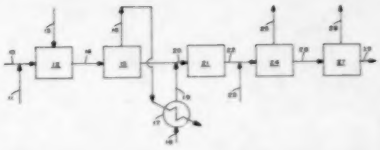
Werner C. Muller, Dobbs Ferry, N.Y., and Franklyn D. Miller, Cincinnati, Ohio, assignors to National Distillers and Chemical Corporation, New York, N.Y.

Filed Nov. 12, 1981, Ser. No. 320,277

The portion of the term of this patent subsequent to Sep. 1, 1998, has been disclaimed.

Int. Cl.³ C13K *1/06*

U.S. Cl. 435—161 **9 Claims**



1. In the acid hydrolysis of carbohydrate polymer in which an aqueous slurry of carbohydrate polymer selected from the group consisting of starch and cellulose is hydrolyzed at elevated pressure and temperature in the presence of an acid catalyst to provide a hydrolysate comprising a sterile aqueous solution of fermentable sugar, the improvement which comprises carrying out hydrolysis in the presence of added aqueous water soluble non-fermentable carbohydrate.

6. The process of claim 1 wherein the hydrolysate is fermented to provide dilute aqueous ethanol, the dilute aqueous ethanol is concentrated by distillation and the stillage resulting from said distillation is used as the source of added water soluble non-fermentable carbohydrate in the hydrolysis of a further quantity of hydrolysate.

4,421,857

NOISE CHECKING METHOD

Lilla S. Sun, Seal Beach, and John C. Anderson, Burbank, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Dec. 15, 1981, Ser. No. 330,973

Int. Cl.³ G01J *3/02*

U.S. Cl. 436—2 **10 Claims**

1. In a method for checking noise of an optical instrument, said instrument being capable of measuring an absorption property of a material as a function of wavelength, of the type comprising measuring an absorption property of a solution over a period of time, the improvement comprising employing as said solution one comprising from about 0.040 to 0.090 molar nitrite, wherein said nitrite is present as a nitrite ionized constituent.

4,421,858

METHOD FOR DETERMINING THE CONCENTRATION OF SELECTED INGREDIENTS IN ANIMAL FEEDS

Dennis E. Jackson, Springfield, Mo., assignor to Cambridge Products, Ltd., Springfield, Mo.

Filed Jul. 10, 1981, Ser. No. 281,979

Int. Cl.³ G01N *33/02, 31/02*

U.S. Cl. 436—20 **14 Claims**

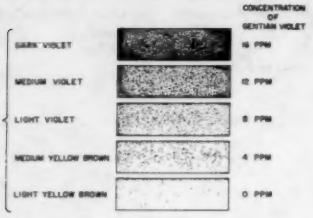
1. A method for measuring the concentration of a selected

finely-divided, dry component of an animal feedstuff comprising the steps performed in the following order;

(a) dispersing gentian violet on a finely-divided carrier, the carrier particles being of approximately the same size as those of the selected components;

(b) admixing thoroughly an amount of gentian violet bearing carrier to the selected animal feedstuff component to label the component;

(c) admixing the labeled component into the animal feedstuff to form a complete animal feedstuff, the quanitity of gentian violet being sufficient to provide, upon complete mixture, a known concentration in the resultant animal feedstuff in the range from about 3 to about 16 parts per million;



(d) selecting a sample of the resultant animal feedstuff and placing it in a container;

(e) adding a sufficient amount of a solvent for gentian violet to cover the sample;

(f) agitating the immersed sample sufficiently to extract the gentian violet from the sample;

(g) separating the gentian violet and solvent from the solid portion of the sample; and

(h) comparing visually the color of the gentian violet solution of step (g) to a suitagle standard for the known concentration to ascertain the concentration of gentian violet in the sample whereby the concentration of the selected component in the resultant feedstuff may be measured concomitantly at the situs of the resultant animal feedstuff.

4,421,859

ASSESSMENT OF THE STATE OF CHANGE OF KERATIN FIBERS

Pierre Bore, Montfermeil, and Arnaud de Labbey, Aulnay-sous-Bois, both of France, assignors to L'Oreal, Paris, France

Continuation of Ser. No. 55,213, Jul. 6, 1979, Pat. No. 4,353,708. This application Jun. 18, 1981, Ser. No. 274,936

Claims priority, application France, Jul. 13, 1978, 78 20975; Jun. 8, 1979, 79 14791

The portion of the term of this patent subsequent to Oct. 12, 1999, has been disclaimed.

Int. Cl.³ G01N *31/00*

U.S. Cl. 436—86 **25 Claims**

1. Process for evaluating the ionic state of keratin fibers with particular respect to the surface thereof, which process comprises:

taking at least one sample having a weight of between about 10 mg and about 50 mg of fibers from the fibers to be evaluated; then

contacting for a period of time of between about one and about two minutes at a temperature of about normal room or other ambient temperature the said fiber sample(s) with at least one acidic solution at a pH value of between about 0.5 and up to but exclusive of 7 of at least one acidic or basic dyestuff,

said solution being in volume in a quantity that is between about 0.25 cm^3 and about 1 cm^3 with the dyestuff(s) concentration in said solution being on an order of between about 0.005% by weight and about 0.02% by weight; and thereafter

observing what, if any, change in the color of the solution has occurred; and, finally

deducing by color comparison the ionic state of at least the surface of said fibers according to the detectable change in coloration of said involved dyestuff solution(s).

4,421,860

HOMOGENEOUS FLUOROIMMUNOASSAY INVOLVING AUTOCORRELATION PROCESSING OF OPTICALLY SENSED SIGNALS

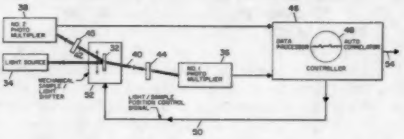
Virgil B. Elings, Santa Barbara, and David F. Nicoli, Goleta, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Continuation-in-part of Ser. No. 194,856, Oct. 7, 1980. This application Oct. 13, 1981, Ser. No. 310,746

The portion of the term of this patent subsequent to Dec. 20, 2000, has been disclaimed.

Int. Cl.³ G01N *33/54, 33/58, 33/52, 21/64*

U.S. Cl. 436—518 **20 Claims**



1. A homogeneous fluorescent immunoassay method comprising the steps of:

providing relatively large carrier particles in solution with antibodies residing at a plurality of sites on each of said carrier particles;

providing at least first and second active components; with the first being an unknown antigen to be tested, the second being tagged with a fluorescent substance;

exposing said carrier particles to the first and second components, to cause a reaction between said first and second components and the antibodies on said particles; whereby the number of fluorescently tagged components bonded to said carrier particles changes;

illuminating the solution containing both the free and bound fluorescently tagged substances with optical radiation at a first wavelength to cause fluorescent output radiation at a second longer wavelength;

optically sensing output signals at said second wavelength resulting from said fluorescent output radiation; and

electronically processing the optically sensed signals to determine the amount of the fluorescently tagged component which is free and/or that which is bound to the carrier particles without physically separating the free and bound fluorescent material, said electronic processing including autocorrelation processing to discriminate between fluorescent radiation arising from the bound fluorescent material and from the free fluorescent material.

4,421,861

HIGH-STRENGTH AND TEMPERATURE-CHANGE RESISTANT CERAMIC FORMED BODY, ESPECIALLY OF MULLITE, ITS PRODUCTION AND USE

Nils Claussen, Leonberg; Günter Petzow, Leinfelden-Echterdingen, both of Fed. Rep. of Germany, and Richard J. Brook, Leeds, England, assignors to Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.v., Gottingen, Fed. Rep. of Germany

Filed May 19, 1980, Ser. No. 150,850

Claims priority, application Fed. Rep. of Germany, May 22, 1979, 2920795

Int. Cl.³ C04B *35/48, 35/50*

U.S. Cl. 501—103 **15 Claims**

1. A ceramic formed body having high temperature change

resistance and strength and being composed of a ceramic matrix with dispersed particles of ZrO_2, HfO_2 or a mixture thereof, said ceramic formed body being produced by the process of:

forming a mixture of a powdered ceramic material which is a precursor to the matrix material of the ceramic matrix; with a compound which can form ZrO_2, HfO_2 or a mixture thereof upon reaction with the ceramic material above a reaction temperature, the reaction temperature being that temperature at which the ceramic material is converted into the matrix material; thereafter

densely sintering said mixture below said reaction temperature; and thereafter

heat treating said densely sintered mixture by raising its temperature above said reaction temperature, to convert the precursor ceramic material into the matrix material and form the ceramic body with in situ formation of the dispersed particles.

4,421,862

CO HYDROGENATION AND ALCOHOL HOMOLOGATION BY MEANS OF SOLUBLE GROUP VIII HOMOGENEOUS CATALYSTS

John S. Bradley, Scotch Plains, N.J., assignor to Exxon Research and Engineering Co., Florham Park, N.J.

Continuation-in-part of Ser. No. 76,967, Sep. 20, 1979, abandoned, which is a continuation of Ser. No. 917,209, Jun. 20, 1978, abandoned. This application Mar. 11, 1981, Ser. No. 242,639

Int. Cl.³ *C07C 27/06*

U.S. Cl. 518—700 **2 Claims**

1. A process for the homogeneous catalytic synthesis of methanol and methyl formate from CO and hydrogen consisting essentially of contacting CO and H_2 with a catalytic system comprising essentially of a soluble ruthenium carbonyl containing complex plus a phosphine in a solvent selected from the group consisting of saturated and aromatic hydrocarbons, ethers, carboxylic acids, alkanols, ketones, esters and lactones at a temperature of from about 250° to 300° C., a pressure of from about 54 to 200 MPa and a CO to H_2 ratio of from 3:1 to 1:10.

4,421,863

PROCESS FOR PREPARING LOW MOLECULAR WEIGHT OXYGENATED COMPOUNDS FROM SYNGAS USING A NOVEL CATALYST SYSTEM

Roger G. Duranleau, Georgetown, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Feb. 1, 1982, Ser. No. 344,276

Int. Cl.³ *C07C 27/06*

U.S. Cl. 518—701 **19 Claims**

1. A process for preparing low molecular weight oxygenated products, especially ethylene glycol and methanol, from syngas which comprises contacting a mixture of carbon monoxide and hydrogen with a catalytic amount of a catalyst comprising a soluble rhodium-containing compound, an organic ligand and a cationic fused ring polynuclear aromatic compound possessing a nitrogen atom at a ring fusion position from the group consisting of salts of phenanthradaziniums, naphthaziniums, acridaziniums and derivatives thereof dissolved in a suitable solvent and heating the resulting mixture at a temperature of 150° C. to 350° C. and pressure of 1000 psig to 15,000 psig for sufficient time to produce the desired low molecular weight oxygenated products.

4,421,864

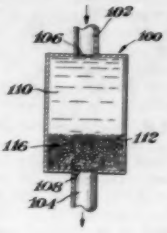
IMPROVED ION EXCHANGE PARTICLE REGENERATION METHOD

John D. Watson, Sr., Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Dec. 9, 1981, Ser. No. 328,964

Int. Cl.³ *B01J 49/00*

U.S. Cl. 521—26 **10 Claims**



1. In a method for regenerating gel ion exchange particles of the type wherein a regenerating fluid is flowed through a bed of unregenerated gel ion exchange particles and ions are exchanged between the fluid and the particles, thereby forming regenerated ion exchange particles;

the improvement comprising:

(a) flowing a regenerating fluid which has a density different from about 0.01 to about 100 lbs. per cu. ft. that of the regenerated particles to cause said regenerated particles to be displaced from the unregenerated bed at a first position in a column;

(b) displacing said particles from the unregenerated bed;

(c) flowing substantially all of said regenerated particles in a direction substantially countercurrent to that of the regenerating fluid; and

(d) reforming the regenerated particles into a bed of regenerated particles at a second position in the column.

4,421,865

SELECTIVE HYDROGEN-DEUTERIUM INTERCHANGE USING ION EXCHANGE RESINS

Jacob Shen, c/o Aramco Service Company, P.O. Box 8745, Dhahran, Saudi Arabia, assignor to Standard Oil Company (Sohio), Cleveland, Ohio

Filed Jun. 8, 1981, Ser. No. 271,467

Int. Cl.³ *B01J 39/20*

U.S. Cl. 521—31 **10 Claims**

1. A process for exchanging at least one labile proton of a first compound with at least one labile deuteron of a second compound, in the absence of a catalyst, the process comprising contacting the first compound with the second compound, with the proviso that one of the compounds is a porous ion exchange resin and the other compound is a non-solid.

4,421,866

METHOD FOR THE PREPARATION OF SYRENE POLYMER FOAM

Kyung W. Suh, Granville; David C. Krueger, Reynoldsburg, and Burch E. Zehner, Pataskala, all of Ohio, assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 29, 1982, Ser. No. 426,414

Int. Cl.³ *C08J 9/14*

U.S. Cl. 521—79 **5 Claims**

1. In a process for the preparation of an alkenyl aromatic thermoplastic resinous elongate foam body having a machine direction and a transverse direction, the body defining a plurality of closed noninterconnecting gas-containing cells therein, the steps of the method comprising heat plastifying an alkenyl aromatic synthetic resinous material, adding to the heat plasti-

fying synthetic resinous material a volatile fluid foaming agent to provide a foaming agent resinous polymer mixture under a pressure sufficiently high that foaming is prevented, mixing the fluid foaming agent with the plastified resin to form a blowable resinous mixture, reducing the temperature of the mixture to a temperature such that when pressure is removed therefrom, a foam of desirable quality is obtained, reducing the pressure on the mixture to thereby cause the mixture to form a foam of desired quality, the foam having a minimal cross section of 8 square inches and a minimal thickness of 0.25 inch and water vapor permeability of not greater than 1.8 perm inches, the improvement which comprises employing a blowing agent selected from the group consisting of

(1) a mixture of from about 5 to 20 weight percent isopropyl alcohol, from about 5 to 50 percent chlorodifluoromethane, and from about 30 to 70 percent dichlorodifluoromethane;

(2) a mixture of from about 5 to 50 percent of an ethanol, methanol or mixtures thereof, from about 5 to 50 percent of chlorodifluoromethane, and about 30 to 70 percent dichlorodifluoromethane;

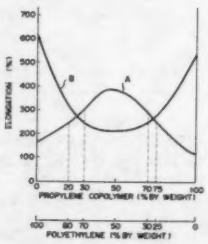
and mixtures thereof, all percentages being by weight.

4,421,867

COMPOSITION FOR A CROSSLINKED POLYOLEFIN FOAM

Akio Nojiri, Kawasaki; Takashi Sawasaki; Isamu Noguchi, both of Tokyo; Shinji Onobori, Hatano, and Junnosuke Sasazima, Hiratsuka, all of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 179,477, Aug. 18, 1980, abandoned. This application Mar. 16, 1982, Ser. No. 358,684
Claims priority, application Japan, Aug. 29, 1979, 54-110063
Int. Cl.³ C08J 9/12
U.S. Cl. 521—82 12 Claims



1. A foamable composition for making a closed cell polyolefin foam which comprises 20 to 75% by weight of crystalline propylene copolymer having a melt index of 1 to 20 and containing 1 to 15% by weight of ethylene and having a crystallinity higher than 50%, 80 to 25% by weight of polyethylene having a density of from 0.920 to 0.945 g/cm³ and a melt index of 1 to 10, a polyfunctional organic monomeric cross-linking agent and a blowing agent.

4,421,868

POLYESTER-MELAMINE THERMOSETTING FOAM AND METHOD OF PREPARATION

Stuart B. Smith, Conyers, Ga., assignor to Thermocell Development, Ltd., Knoxville, Tenn.

Continuation-in-part of Ser. No. 379,118, May 17, 1982, abandoned. This application Sep. 28, 1982, Ser. No. 425,396
Int. Cl.³ C08J 9/14
U.S. Cl. 521—112 18 Claims

1. A polyester thermosetting foam composition having improved flame, smoke and burning high-temperature properties with high compressive strength, which foam composition is prepared by:

(a) the mixing of a saturated polyester resin, which resin is prepared by the reaction of a saturated dicarboxylic acid with an aliphatic dihydroxy alcohol, to provide a saturated polyester resin having reactive hydroxyl groups, with from about 100 or more parts of melamine per 100 parts of the saturated resin; and,

(b) reacting the melamine-polyester admixture in the presence of a blowing agent, sufactant and trimerization catalyst and in the absence of a urethane catalyst, with a methylene diisocyanate, to produce the thermosetting foam composition.

4,421,869

CATALYST FOR MAKING POLYURETHANES

Francis W. Arbir, Itasca; Daniel S. Raden, Hawthorn Woods, and Kenneth W. Narducy, Bloomingdale, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Division of Ser. No. 267,150, May 26, 1981, Pat. No. 4,366,084. This application Oct. 21, 1982, Ser. No. 435,841
Int. Cl.³ C08G 18/14
U.S. Cl. 521—126 4 Claims

1. The process of preparing a polyurethane foam from a polyisocyanate and a polyol in the presence of a blowing agent, consisting essentially in carrying out the reaction in the presence of a catalytically effective amount of a partially blocked DMAPA, said partial blocking being caused by the inclusion of phenol in the molar amount of 10–50% of said DMAPA.

4,421,870

PROCESS FOR THE PREPARATION OF CELLULAR POLYURETHANE ELASTOMERS BASED ON 4,4'-DIISOCYANATO-1,2-DIPHENYLETHANE

Herbert Stutz, Karlsruhe; Karl H. Illers, Otterstadt; Herbert Haberkorn, Gruenstadt, and Walter Heckmann, Weinheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Sep. 20, 1982, Ser. No. 419,755
Claims priority, application Fed. Rep. of Germany, Sep. 26, 1981, 3138422
Int. Cl.³ C12P 7/16
U.S. Cl. 521—160 9 Claims

1. In a process for the manufacture of molded cellular polyurethane elastomers by reacting (a) an organic polyisocyanate with (b) higher molecular weight polyhydroxyl compounds and (c) water as well as possibly (d) chain extenders in the presence of (e) auxiliaries and/or additives wherein the improvement comprises using 4,4'-diisocyanato-1,2-diphenylethane or diisocyanato-1,2-diphenylethane isomer mixtures containing more than 95 percent by weight of 4,4'-diisocyanato-1,2-diphenylethane as the organic polyisocyanate.

4,421,871

PROPYLENE OXIDE ADDUCTS OF TOLUENEDIAMINE

Alexander Korczak, Grosse Ile, and William W. Levis, Jr., Wyandotte, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Division of Ser. No. 326,298, Dec. 1, 1981, Pat. No. 4,391,728. This application Feb. 22, 1983, Ser. No. 468,202
Int. Cl.³ C08G 18/14
U.S. Cl. 521—167 15 Claims

1. A process for preparing a polyurethane foam comprising reacting, in the presence of a blowing agent and catalyst, an organic polyisocyanate with a polyol composition comprising the reaction product prepared by reacting from 4 to 9 moles of propylene oxide per mole of toluenediamine at temperatures greater than 140° C. in the presence of at least 0.6 part of alkali metal hydroxide per 100 parts of toluenediamine with the proviso that at least 0.8 part of alkali metal hydroxide is used if the toluenediamine is 2,4-toluenediamine or 2,6-toluenediamine, or mixtures thereof.

4,421,872

PROCESS FOR THE PREPARATION OF ELASTIC FLEXIBLE POLYURETHANE FOAMS

Ingolf Blüethe, Bochl-Iggelheim; Wolfgang Straehle, Heidelberg; Matthias Marx, Bad Durkheim, and Reinhard Peters, Munich, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Sep. 2, 1982, Ser. No. 414,572

Claims priority, application Fed. Rep. of Germany, Sep. 18, 1981, 3137132

Int. Cl.³ C08G *18/00, 18/14*

U.S. Cl. 521—174 8 Claims

1. In the process for the manufacture of elastic flexible polyurethane foams by reacting organic polyisocyanates with polyoxyalkylene polyols in the presence of catalysts, blowing agents, and, optionally, compounds serving as chain extenders or cross-linkers, fillers, plasticizers, flame retardant, cell openers, mold release agents, colorants, and the like, the improvement wherein the polyoxyalkylene polyol used has terminal oxyethylene blocks equivalent to an oxyethylene degree of 1 to 13 and at least a minimum primary hydroxyl group content expressed as a percentage of total hydroxyl groups, which increases with the degree of oxyethylation as shown in curve A of the FIGURE.

4,421,873

OXIDATIVELY COUPLED COLD-SET BINDERS

Charles E. Seeney, Brazil; John F. Kraemer, Terre Haute, both of Ind., and Nancy C. Varnum, Kingsville, Mo., assignors to International Minerals & Chemical Corp., Terre Haute, Ind.

Division of Ser. No. 283,718, Jul. 16, 1981, Pat. No. 4,393,152. This application Aug. 25, 1982, Ser. No. 411,202

Int. Cl.³ C08K *3/34*

U.S. Cl. 523—145 16 Claims

1. A process for preparing foundry cores and molds comprising the steps of (a) mixing a foundry aggregate with an ortho-substituted phenol-formaldehyde polymerizable binder capable of being oxidatively coupled, a metal salt catalyst therefor selected from the group consisting of a salt of lead, manganese, cobalt II or copper I and an amine, (b) placing the mixture in a mold or core box and (c) passing an oxygen source through the mixture to effect oxidative polymerization of the binder and (d) removing the core or mold from the core box or mold.

4,421,874

POLYMER SLURRY WASHING

Charles L. Seefluth, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jun. 2, 1981, Ser. No. 269,206

Int. Cl.³ C08F *6/08*

U.S. Cl. 523—315 8 Claims

1. Process for purification of a polymer slurry comprising solid polymer particles and a fluid phase containing a liquid wherein said fluid phase contains at least one ingredient to be at least partially removed from said slurry, said process comprising

(a) moving said slurry in a first direction continuously or discontinuously through a housing confined by a wall, said wall comprising at least one filter portion, wherein said portion is made of a filter material permitting said fluid phase to pass through but preventing a substantial amount of said solid polymer particles from passing through,

(b) injecting a wash fluid into said housing at a location and under pressure conditions such as to cause a flow of said wash fluid in a second direction through said slurry thereby replacing at least a portion of said fluid phase by said wash fluid and causing said portion of said fluid phase to leave the housing through said filter, said first and second direction forming a substantial angle with each other,

(c) recovering a purified polymer slurry as the product of the process, said purified polymer slurry comprising solid polymer particles and a purified fluid phase containing substantially less of said at least one ingredient as compared to the fluid phase of the starting polymer slurry.

4,421,875

PROCESS FOR THE MANUFACTURE OF IMPACT RESISTANT THERMOPLASTIC MOLDING MATERIALS

Graham E. McKee, Weinheim; Franz Brandstetter, Neustadt; Adolf Echte, Ludwigshafen; Juergen Hambrecht, Heidelberg; Heinz-Juergen Overhoff; Edmund Priebe, both of Frankenthal; Josef Schwaab, Maikammer, and Peter Siebel, Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Apr. 8, 1982, Ser. No. 366,697

Int. Cl.³ C08J *3/02*

U.S. Cl. 523—335 5 Claims

1. In a process for the preparation of an impact resistant thermoplastic material comprising:

(Step I) the aqueous emulsion polymerization at a temperature of between 30° C. and 90° C. of at least one monomer selected from the group consisting of

(a) conjugated diolefins having 4 to 5 carbon atoms and

(b) acrylate esters of alcohols having 1 to 8 carbon atoms, and, optionally,

(c) 0 to 30 weight percent of monomers which copolymerize with (a) or (b), and

(d) 0 to 10 weight percent of monomers having a cross-linking action, in the presence of

(e) 0.3 to 5 weight percent based on monomers of an emulsifier, and

(f) a vinyl polymerization initiator,

to produce a rubber latex having a solids content of 33 to 50 weight percent and an average particle size (d_{50}-value of the integral mass distribution) in the range of 0.02 to 0.15 micron;

(Step II) agglomeration of the latex of Step I by the addition of a dilute aqueous dispersion of a chemically acting agglomerating agent selected from the group consisting of

(g) copolymers of C_1–C_4 alkyl acrylates with 0.1 to 10 weight percent of acrylic or methacrylic acid or amide, and

(h) polyvinylether,

wherein the agglomerating agent is used in an amount between 0.2 and 20 weight percent (solids basis) of the rubber polymer at a temperature of 20° C. to 90° C. for a period of time required to increase the average particle size (d_{50}-value) to 0.20 to 0.65 micron; and

(Step III) graft polymerization of the agglomerated rubber latex of Step II with a monomer selected from the group consisting of styrene, acrylonitrile, methyl methacrylate, and mixtures thereof optionally with a non-conjugated diolefinic monomer having a cross-linking action wherein 20 to 90 weight percent of the grafted polymer is derived from the grafting monomer and 80 to 10 weight percent from the agglomerated rubber latex polymer,

the improvement comprising using as the emulsifier (e), a potassium salt of a saturated or unsaturated carboxylic acid having 10 to 30 carbon atoms.

4,421,876

RESINOUS COMPOSITIONS CONTAINING MODIFIED ALUMINA HYDRATE CRYSTALS

Jorg F. Greber, Bonn, and Gunter Winkhaus, Konigswinger, both of Fed. Rep. of Germany, assignors to Vereinigte Aluminium-Werke Aktiengesellschaft, Bonn, Fed. Rep. of Germany

Division of Ser. No. 98,846, Nov. 30, 1979, Pat. No. 4,340,579. This application Apr. 5, 1982, Ser. No. 365,626

Claims priority, application Fed. Rep. of Germany, Dec. 2, 1978, 2852273

Int. Cl.³ C08K *3/10*

U.S. Cl. 523—402 **6 Claims**

1. A composition comprising a thermosetting or thermoplastic material admixed with a flame retardant effective amount of modified alumina hydrate particles, said alumina hydrate particles having a mean particle diameter of less than about 35 microns and less than about 0.1 percent by volume of said particles having a diameter of less than about 2 microns, said particles further having substantially rounded edges and smooth surfaces, said particles obtained by isolating gibbsite trihydrate crystals from the Bayer process, selecting from said crystals a portion having a mean crystal diameter having a predetermined range of between about 40 and about 100 microns, partially dissolving said selected crystals in caustic solution having a concentration of between 100 and 200 grams per liter caustic, and isolating the modified particles from said caustic solution.

4,421,877

FLAME-RESISTANT AQUEOUS EPOXY IMPREGNATING COMPOSITIONS CONTAINING NONIONIC SURFACE ACTIVE AGENTS

William M. Alvino, Penn Hills, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 7, 1982, Ser. No. 415,096

Int. Cl.³ B05D *3/02*; C08L *63/02*; C09J *5/02*

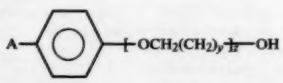
U.S. Cl. 523—414 **17 Claims**

1. An aqueous impregnating emulsion, said emulsion consisting essentially of the admixture of:

(a) an epoxy resin;

(b) a flame retardant phenol;

(c) a nonionic alkylaryl polyether alcohol surface active agent having the general structural formula:



where A is an alkyl group having from 5 to 10 carbons, y=1 to 2, and z=15 to 70;

(d) a latent curing agent selected from the group consisting of monomethylol dicyandiamide and dicyandiamide; and

(e) water; where the weight ratio of (epoxy resin):(flame retardant phenol):(nonionic surface active agent solids):(latent curing agent solids) is about (100):(1 to 100):(13 to 25):(2 to 10).

4,421,878

FLUOROELASTOMER FILM COMPOSITIONS AND SOLUTIONS CONTAINING EPOXY RESIN ADDUCTS

Donald Close, Stow, Ohio, assignor to David Hudson, Inc., Stow, Ohio

Division of Ser. No. 187,721, Sep. 16, 1980, abandoned, which is a continuation of Ser. No. 178,895, Sep. 18, 1980, abandoned. This application Nov. 25, 1981, Ser. No. 324,840

Int. Cl.³ C08L *27/20, 27/12*

U.S. Cl. 523—454 **10 Claims**

1. An improved cured fluoroelastomer film composition consisting essentially of:

a fluoroelastomer gum; and

a curative selected from the group consisting of polyamine and polyamide adducts of epoxy resins and blends of fatty amidoamine resins and polyamide adducts of epoxy resins, the improvement wherein said film composition is devoid of metal oxides.

4. An improved fluoroelastomer solution consisting essentially:

a fluoroelastomer gum;

a curative selected from the group consisting of polyamine and polyamide adducts of epoxy resins and blends of fatty amidoamine resins and polyamide adducts of epoxy resins; and

a solvent for said gum and said curative the improvement wherein said fluoroelastomer is cured in the absence of metal oxides.

4,421,879

USE OF 3,4-DISUBSTITUTED ANILINES AS ACCELERATORS FOR UNSATURATED POLYESTER RESINS

Erich Eimers; Klaus Kraft, and Dieter Margotte, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

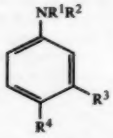
Filed Aug. 30, 1982, Ser. No. 412,513

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1981, 3136292

Int. Cl.³ C08L *67/02*

U.S. Cl. 523—500 **8 Claims**

1. A composition comprising (a) an unsaturated polyester resin which is a mixture of from 30 to 75 parts by weight of α,β-ethylenically unsaturated polyester and 70 to 25 parts by weight of an unsaturated monomer copolymerizable therewith; (b) 1 to 10% by weight of an accelerator, based on said unsaturated polyester resin, said accelerator being of the formula



wherein R^1 and R^2 which may be the same or different are saturated or unsaturated, optionally OH-substituted hydrocarbon radicals containing from 1 to 18 carbon atoms, one of the two radicals R^3 and R^4 is an optionally phenyl-substituted C_1–C_4-alkyl radical or a C_5–C_6-cycloalkyl radical and the other of said radicals R^3 and R^4 is a halogen atom; (c) 0.01 to 0.1% by weight, based on unsaturated polyester resin, of at least one inhibitor and (d) 50 to 350 parts by weight of a filler based on each 100 parts by weight of polyester resin.

4,421,880

AMINOPLAST RESIN CROSSLINKING AGENTS AND NITROALKANOL USED TO TREAT CELLULOSE

Jerry H. Hunsucker, and Milton E. Woods, both of Terre Haute, Ind., assignors to International Minerals & Chemical Corp., Terre Haute, Ind.

Continuation-in-part of Ser. No. 63,221, Aug. 3, 1979, abandoned. This application Jul. 21, 1980, Ser. No. 170,437

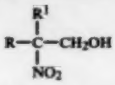
The portion of the term of this patent subsequent to Aug. 26, 1997, has been disclaimed.

Int. Cl.³ C08G *6/00, 12/12*; C08L *61/02*

U.S. Cl. 524—14 **22 Claims**

20. Improved particle board comprising cellulose particles and fibers and a crosslinking agent selected from the group consisting of ethylene urea, carbamate, triazone, and curable urea-formaldehyde resin, wherein the cellulose particles and

fibers are impregnated with a composition comprising the crosslinking agent and from 0.18 to 1.42 parts per part of the agent of a nitroalkanol of the formula



where R and R^1 are hydrogen, methyl, ethyl or hydroxymethyl and can be the same or different.

4,421,881

NITROCELLULOSE LACQUER COMPOSITION CONTAINING GELATIN AND ACRYLIC COPOLYMERS

Sol Benkendorf, 2403 Mountainbrook Dr., Richmond, Va. 23233; Frank A. Calamito, 1 Babbling Brook Rd., Sufferin, N.Y. 10901, and Carmine M. Zaccaria, 574 Chestnut St., Westwood, N.J. 07675

Continuation-in-part of Ser. No. 246,836, Mar. 23, 1981, abandoned. This application Apr. 19, 1982, Ser. No. 369,379

Int. Cl.³ C08L *1/18, 89/06;* **C08J** *3/20*

U.S. Cl. 524—24 **13 Claims**

1. A lacquer composition, comprising:

A. a nitrocellulose primary film former,

B. at least two resinous secondary film-formers, one of said at least two secondary film formers being acrylic copolymer present in an amount between about 10% and about 70% by weight based on the total of secondary film formers, and in an amount less than about 4% based on the weight of said lacquer composition,

C. a Type B water-soluble animal gelatin prepared by alkaline hydrolysis of animal bone and hide, wherein said gelatin has a molecular weight range of 15,000 to 250,000 and an average molecular weight of 50,000 to 70,000, and wherein said gelatin comprises:

(i) 50–80 weight % animal bone-derived gelatin,

(ii) 20–50 weight % animal hide-derived gelatin,

D. plasticizer, and

E. liquid carrier.

4,421,882

BLEND COMPOUNDS OF SULFONATED POLYMERS AND COMPOSITIONS THEREOF

Robert D. Lundberg, Bridgewater; Warren A. Thaler, Aberdeen, and Pawan K. Agarwal, Westfield, all of N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

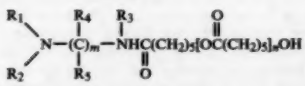
Filed Dec. 21, 1981, Ser. No. 332,860

Int. Cl.³ C08L *1/18, 51/04, 51/08, 81/00*

U.S. Cl. 524—31 **10 Claims**

1. A polymer blend which comprises a blend of:

(a) a sulfonated polymer which has about 10 to about 200 meq. of sulfonate groups per 100 grams of said sulfonated polymer, said sulfonate groups being neutralized with a polycaprolactone polymer having the formula:



wherein n=1 to 500, m=1 to 20, R_1 or R_2 is selected from the group consisting of alkyl and cycloalkyl groups having about 1 to about 20 carbon atoms and aryl groups, and R_3 is selected from the group consisting of hydrogen, alkyl and cycloalkyl groups having about 1 to about 20 carbon atoms and aryl groups, and R_4 and R_5 are selected from the group consisting of hydrogen, alkyl, cycloalkyl and aryl groups and said polycaprolactone polymer has an M_n as measured by GPC of about 200 to about 50,000 and a melting point from below room temperature to about 55° C., wherein said neutralized sulfonated polymer is formed from an elastomeric polymer selected from the group consisting of Butyl rubber and an EPDM terpolymer, said component having about 5 to about 50 percent of said sulfonated polymer neutralized with said polycaprolactone polymer; and

(b) an unsulfonated thermoplastic or elastomeric polymer.

4,421,883

POLYPHENYLENE ETHER MOLDING COMPOSITIONS THAT INCLUDE AN ALKENYL AROMATIC RESIN AND AN EPDM RUBBER

Gleun D. Cooper, Delmar; Gim F. Lee, Jr., Albany, and Rainey A. Shufelt, Coeymans, all of N.Y., assignors to General Electric Company, Pittsfield, Mass.

Division of Ser. No. 111,983, Jan. 14, 1980, Pat. No. 4,315,084. This application Aug. 14, 1981, Ser. No. 292,747

Int. Cl.³ C08K *5/52*

U.S. Cl. 524—127 **8 Claims**

1. A thermoplastic molding composition which consists essentially of:

(a) from 35–95 parts by weight of a polyphenylene ether resin;

(b) from 65–5 parts by weight of a phosphate compound; and

(c) from 1–15 parts by weight of a rubbery interpolymer of a mixture of monoolefins and a polyene.

4,421,884

OIL-RESISTANT RUBBER COMPOSITION

Motofumi Oyama, Yokosuka, and Kinro Hashimoto, Yokohama, both of Japan, assignors to Nippon Zeon Co. Ltd., Tokyo; Toyota Jidosha Kabushiki Kaisha and Toyoda Gosei Co. Ltd., both of Aichi, all of, Japan

Filed Aug. 4, 1982, Ser. No. 405,025

Claims priority, application Japan, Aug. 11, 1981, 56-125681

Int. Cl.³ C08L *9/02*

U.S. Cl. 524—209 **4 Claims**

1. An oil-resistant rubber composition comprising 98 to 50 parts by weight of (1) a partially hydrogenated unsaturated nitrile/conjugated diene copolymer rubber in which at least 50% of units derived from the conjugated diene are hydrogenated, and 2 to 50 parts by weight of (2) a liquid copolymer having a number average molecular weight of 500 to 10,000 obtained by copolymerizing 10 to 80% by weight of a conjugated diene, 10 to 70% by weight of an unsaturated nitrile and 0 to 20% by weight of a vinyl monomer copolymerizable with these monomers, the total amount of the components (1) and (2) being 100 parts by weight.

4,421,885

HALOGEN-CONTAINING RESIN COMPOSITION CONTAINING ESTER PLASTICIZER

Katsuhiro Tsuda, Sakai; Hisao Tanaka, Sennan; Michio Nagae, Izumiohtsu, and Yasuhiko Imanaga, Kaizuka, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan

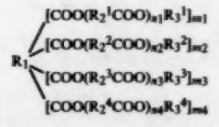
Division of Ser. No. 175,764, Aug. 6, 1980, Pat. No. 4,317,760. This application Sep. 17, 1981, Ser. No. 303,123

Claims priority, application Japan, Jul. 31, 1979, 54-97560

Int. Cl.³ C08K *5/10, 5/11, 5/15*

U.S. Cl. 524—295 **16 Claims**

1. A halogen-containing resin composition comprising (1) a halogen-containing resin and (2) as a plasticizer, at least one compound of the general formula



wherein R_1 represents an aromatic hydrocarbon group containing 1 or 2 aromatic rings or an alicyclic hydrocarbon group

having 4 to 37 carbon atoms, R_2^1, R_2^2, R_2^3 and R_2^4 are identical or different and each represents an aliphatic hydrocarbon group having 2 to 17 carbon atoms, R_3^1, R_3^2, R_3^3 and R_3^4 are identical or different and each represents an aliphatic hydrocarbon group having 5 to 22 carbon atoms, an aromatic hydrocarbon group or a heterocyclic group, each of n_1, n_2, n_3 and n_4 is 0 or an integer of 1 to 20 and the sum of these is 1 to 20, and each of m_1, m_2, m_3 and m_4 is 0 or 1 and the sum of these is 1 or 2.

4,421,886

STABILIZER-LUBRICANT COMBINATION OF LEAD COMPOUNDS AND PARTIAL ESTERS OF PENTAERYTHRITOL AND/OR TRIMETHYLOLPROPANE WITH FATTY ACIDS FOR MOLDING COMPOSITIONS BASED ON POLYVINYL CHLORIDE

Kurt Worschech, and Peter Wedl, both of Loxstedt, Fed. Rep. of Germany, assignors to Neynaber Chemie GmbH, Loxstedt, Fed. Rep. of Germany

Continuation of Ser. No. 188,577, Sep. 18, 1980, abandoned, which is a continuation of Ser. No. 30,845, Apr. 17, 1979, abandoned, which is a continuation-in-part of Ser. No. 834,458, Sep. 19, 1977, abandoned. This application Jun. 3, 1981, Ser. No. 269,895

Claims priority, application Fed. Rep. of Germany, Nov. 17, 1976, 2652328

Int. Cl.³ C08K *5/10*

U.S. Cl. 524—310 **5 Claims**

1. A moldable composition consisting essentially of from 90 to 99.5% by weight of a thermoplastic resin selected from the group consisting of polyvinyl chloride, a mixed polymer containing mainly vinyl chloride, and any mixture thereof, and from 0.5 to 10% by weight of a stabilizer-lubricant composition consisting essentially of:

(a) a stearic acid ester of pentaerythritol which has an OH number between 120 and 600 and an acid number below 15, and

(b) a tribasic lead compound, wherein 15 to 1500 parts by weight of tribasic lead compound are present for each 100 parts by weight of said stearic acid ester of pentaerythritol.

4,421,887

BIAXIALLY ORIENTED POLYESTER FILMS

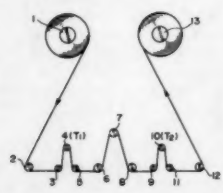
Shigeru Horie; Takamasa Asano; Tetsuo Ichihashi, all of Matsuyama, and Hideo Katoh, Kanagawa, all of Japan, assignors to Teijin, Limited, Osaka, Japan

Filed May 20, 1982, Ser. No. 380,433

Claims priority, application Japan, May 27, 1981, 56-79121

Int. Cl.³ C08K *5/10*

U.S. Cl. 524—317 **7 Claims**



1. A biaxially oriented polyester film composed of a polyester composition comprising

(A) 100 parts by weight of a substantially linear polyalkylene terephthalate having ethylene terephthalate as a main structural component,

(B) 0.01 to 5 parts by weight of a partial ester of an aliphatic polyol having 4 to 6 hydroxyl groups and 5 or 6 carbon atoms in the molecule with an aliphatic monocarboxylic acid having 8 to 30 carbon atoms, and

(C) not more than 0.8 part by weight of fine inorganic particles having an average particle diameter of not more than about 1 micron and being substantially insoluble in the polyalkylene terephthalate.

4,421,888

SUSTAINED HIGH ARC RESISTANT POLYESTER COMPOSITION

Tsuneyoshi Okada, Fuji, Japan, assignor to Celanese Corporation, New York, N.Y.

Filed Mar. 30, 1982, Ser. No. 363,676

Int. Cl.³ C08L *67/02*

U.S. Cl. 524—371 **13 Claims**

1. A non-burning, non-dripping polyester molding composition with a sustained high level of arc resistance and tracking resistance, comprising:

(A) approximately 30 to 60 percent by weight of the composition a mixture of polybutylene terephthalate and polyethylene terephthalate wherein polyethylene terephthalate comprises approximately 3 to 20 percent by weight of the composition;

(B) approximately 30 to 60 percent by weight of the composition of a mixture of talc and fiber glass wherein said talc comprises about 15 to 35 percent by weight of the composition; and

(C) an effective amount, up to 20 percent by weight of the composition of a flame retardant or flame retardant mixture to render the composition non-burning.

4,421,889

AQUEOUS DISPERSION PAINTS AND PROCESS FOR MAKING THE SAME

Helmut Braun, Hofheim; Helmut Rinno, Lorsbach, and Werner Stelzel, Bad Soden am Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 233,823, Feb. 12, 1981, abandoned, which is a continuation of Ser. No. 819,272, Jul. 27, 1979, abandoned, which is a continuation of Ser. No. 712,363, Aug. 6, 1976, abandoned, Ser. No. 712,364, Aug. 6, 1976, abandoned, Ser. No. 712,365, Aug. 6, 1976, abandoned. This application May 13, 1983, Ser. No. 493,803

Claims priority, application Fed. Rep. of Germany, Aug. 8, 1975, 2535372; Aug. 8, 1975, 2535373; Aug. 8, 1975, 2535374

Int. Cl.³ C08L *35/02*; C09D *3/74*

U.S. Cl. 524—381 **16 Claims**

1. A paint composition having improved wet adhesion consisting essentially of an aqueous dispersion of at least one polymer, from 3% to 20% by weight of said composition of a gloss-improving organic solvent selected from the group consisting of glycols, glycol ethers and glycol esters and a pigment in an amount of 7% to 30% by volume, the polymer of said aqueous dispersion being a copolymer of at least one olefinically unsaturated monomer and from 1 to 5% by weight, based on the weight of the copolymer, of an ethylenically unsaturated acetoacetic acid ester copolymerizable therewith.

4,421,890

FIRE RETARDING SYSTEM FOR POLYMERIC COMPOSITIONS, AND A METHOD AND PRODUCTS COMPRISING THE SAME

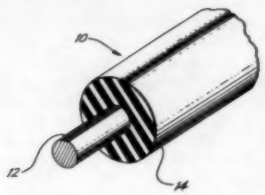
Burton T. MacKenzie, Jr., Monroe, and Sidney Rothenberg, Fairfield, both of Conn., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 869,256, Jan. 13, 1978, abandoned, which is a continuation of Ser. No. 725,324, Sep. 21, 1976, abandoned, which is a division of Ser. No. 585,069, Jun. 9, 1975, Pat. No. 4,022,945, which is a continuation-in-part of Ser. No. 400,830, Sep. 26, 1973, Pat. No. 3,908,068. This application Dec. 31, 1981, Ser. No. 336,241

The portion of the term of this patent subsequent to Sep. 23, 1992, has been disclaimed.

Int. Cl.³ C08K 3/22, 5/02

U.S. Cl. 524—431 7 Claims



1. A flame resistant polymeric composition comprising an ethylene-containing polymer containing a flame retarding system consisting essentially of the combination of:

(a) at least one bromine-containing hydrocarbon selected from the group consisting of hexabromobiphenyl, and decabromobiphenyl in an amount sufficient to provide about 8 to about 50 percent by weight of bromine based upon the organic content of the composition; and

(b) an oxide of iron in an amount of about 3 to about 15 percent by weight of the organic content of the composition.

4,421,891

BEAD FILLER RUBBER COMPOSITION

Itsuo Miyake, Kodaira; Keizo Okamoto, Higashikurume; Motonori Bundo, Higashimurayama, and Akihiro Noda, Kodaira, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Continuation of Ser. No. 85,346, Oct. 16, 1979, abandoned. This application Feb. 27, 1981, Ser. No. 238,875

Claims priority, application Japan, Oct. 18, 1978, 53-127256

Int. Cl.³ C08L 61/14, 7/00

U.S. Cl. 524—495 8 Claims

1. A bead filler rubber composition, consisting essentially of:

(a) 100 parts by weight of a rubber selected from the group consisting of natural rubber, polyisoprene rubber, polybutadiene rubber, styrene-butadiene copolymer rubber and blends thereof;

(b) 40–130 parts by weight of carbon black having an iodine adsorbability of 40–130 mg/g and a dibutyl phthalate absorbability of not higher than 130 ml/100 g;

(c) 15–45 parts by weight per 100 parts by weight of carbon black of a mixture of a novolak phenolic resin selected from the group consisting of novolak phenol resin, novolak cresol resin, novolak resorcinol resin; and a novolak modified phenolic resin obtained by modifying with a compound selected from the group consisting of oils, aromatic hydrocarbons, or rubbers, wherein the mixing ratio of the novolak phenolic resin to the novolak modified phenolic resin is from 80/20 to 20/80 by weight, an effective amount of a hardener for the resin.

4,421,892

THERMOPLASTIC POLYMERIC MATERIAL AND METHOD FOR THE PREPARATION THEREOF

Hideo Kasahara; Kichiya Tazaki, both of Yokohama; Kunio Fukuda, Chigasaki, and Hiroshi Suzuki, Tokyo, all of Japan, assignors to Asahi-Dow Limited, Tokyo, Japan

Continuation of Ser. No. 190,737, Sep. 25, 1980, abandoned, which is a continuation-in-part of Ser. No. 355,384, Mar. 8, 1982, abandoned. This application May 6, 1982, Ser. No. 375,685

Claims priority, application Japan, Oct. 4, 1979, 54/127298; Oct. 9, 1979, 54/129467; Nov. 14, 1979, 54/146506; Feb. 8, 1980, 55/13560

Int. Cl.³ C08G 81/02

U.S. Cl. 524—514 21 Claims

1. A thermoplastic polymeric material predominantly comprising a novel copolymer, said novel copolymer being composed of polymer chain moieties A having a molecular weight of 30,000 to 300,000 derived from a hard styrene copolymer and polymer chain moieties B having a molecular weight of 10,000 to 50,000 derived from a polyamide, said polymer chain moieties A and B being chemically bonded to each other, said styrene copolymer including 2 to 30 mol% of α,β-unsaturated dicarboxylic acid anhydride and a styrene compound, said styrene copolymer being contained in a range of 10 to 65% by weight based on the weight of the said novel copolymer, said polyamide being contained in a range of 90 to 35% by weight based on the weight of the said novel copolymer and said polymeric material having a fine dispersion microstructure of not greater than 5μ in avarage particle diameter of the disperse phase.

4,421,893

TINTABLE, DYEABLE, CURABLE COATINGS AND COATED ARTICLES

Loren A. Haluska, and Marcelle G. Molzahn, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

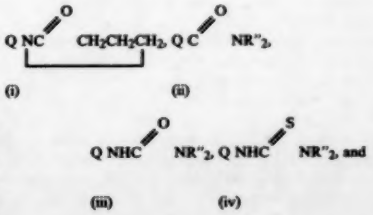
Filed Jan. 18, 1982, Ser. No. 340,160

Int. Cl.³ C08L 83/00

U.S. Cl. 524—588 6 Claims

1. A composition of matter which comprises

(A) 1 to 50 weight percent, based on the weight of (A) and (B), of a silane having the general formula $(XO)_3SiRSR'$ wherein X is an alkyl radical of 1 to 4 carbon atoms, R is a divalent aliphatic hydrocarbon radical containing less then five carbon atoms and R' is selected from a group consisting of



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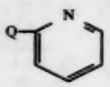


(v)

wherein Q is a radical selected from a group consisting of $-CH_2CH_2-$, $-CH_2CH_2CH_2-$,

$$-\underset{CH_3}{\overset{|}{CH}}-,\quad -\underset{CH_3}{\overset{|}{CHCH_2}}-\text{ and }-\underset{(CH_3)_2}{\overset{|}{C}}-;$$

wherein in groups (iii) and (iv), R'' is hydrogen or the methyl group and in group (ii), R'' is hydrogen, the methyl group or the isobutoxymethyl group, and

(B) 99 to 50 weight percent, based on the weight of (A) and (B), of a curable resin compatible with component (A).

2. A composition of matter as claimed in claim 1 wherein (A) is present at 15 to 35 weight percent and (B) is present at 85 to 65 weight percent.

3. A composition of matter as claimed in claim 2 wherein component (B) is a pigment-free aqueous coating composition comprising a dispersion of colloidal silica in lower aliphatic alcohol-water solution of the partial condensate of a silanol of the formula $R'''Si(OH)_3$ in which R''' is selected from the group consisting of alkyl radicals of 1 to 3 inclusive carbon atoms, the vinyl radical, the phenyl radical, the 3,3,3-trifluoropropyl radical, the gamma-glycidoxypropyl radical, the gamma-methacryloxypropyl radical, and the gamma-mercaptopropyl radical, at least 70 weight percent of the silanol being $CH_3Si(OH)_3$, said composition containing 10 to 50 weight percent solids consisting essentially of 10 to 70 weight percent colloidal silica and 30 to 90 weight percent of the partial condensate, said composition containing sufficient acid to provide a pH in the range of 3.0 to 6.0.

4,421,894

POLYURETHANE OLIGOMER IMPACT AND SHRINKAGE MODIFIERS FOR THERMOSET POLYESTERS

James M. O'Connor, Clinton; Donald L. Lickei, Wallingford, and Willie J. Sessions, New Haven, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation of Ser. No. 16,857, Mar. 2, 1979, abandoned. This application Nov. 24, 1980, Ser. No. 210,076

Int. Cl.³ C08L *67/06, 67/02*

U.S. Cl. 525—28 **18 Claims**

1. In a thermosetting polyester resin composition comprising a polyester resin, a catalyst, and at least one of a reinforcing agent or a filler; the improvement comprising the addition of an effective proportion of a polyurethane oligomer modifier, said oligomer prepared by reacting:

(a) an isocyanate-terminated prepolymer which is the reaction product of an organic diisocyanate with a polyol having an average equivalent weight of about 1,000 to about 3,000, in an equivalent ratio of NCO to OH ranging from about 1.02/1 to about 1.6/1 with

(b) an isocyanate reactive group-containing unsaturated monomer to result in an oligomer product having terminal reactive unsaturation and a final free NCO content of from 0 to about 1 percent.

4,421,895

PROCESS FOR THE MANUFACTURE OF ABS POLYMERS AND USE THEREOF IN PREPARATION OF MOLDED PARTS

Adolf Echte, Ludwigshafen; Hermann Gausepohl, Neustadt, and Karl Gerberding, Wachenheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Dec. 10, 1981, Ser. No. 329,596

Int. Cl.³ C08F *279/04*

U.S. Cl. 525—53 **3 Claims**

1. A process for the manufacture of acrylonitrile butadiene styrene polymer particles which comprises continually polymerizing a mixture of

(a) styrene and

(b) acrylonitrile, in a ratio of (a):(b) between 90:10 and 10:90

in the presence of

(c) 3 to 35 percent by weight, relative to the weight of (a) and (b), of a styrene-butadiene block copolymer of solution viscosity, measured in a 5 percent by weight solution in styrene at 25° C., of equal to or less than 80 mPa.s,

(d) a solvent selected from the group consisting of methylethyl ketone,toluene and ethylbenzene, wherein the ratio of the percent of solvent, expressed by $100[d/(a+b+c+d)]$ to the solution viscosity of (c) is greater than 0.4,

(e) from 0.02 to 0.5 percent by weight, relative to the weight of (a) and (b), of a radical initiator selected from the group consisting of t-butyl peroxybenzoate, t-butyl peroctoate and dibenzoyl peroxide,

at a temperature from 80° C. to 180° C. in two or more reaction zones; with stirring and removal of monomers and solvent in a degassing zone.

4,421,896

METHOD OF COUPLING A PROTEIN TO A POLYMER PARTICLE CONTAINING HYDRAZIDE GROUPS IN A POLYMER LATEX AND THE PRODUCTS FORMED THEREFROM

Linneaus C. Dorman, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 93,409, Nov. 13, 1979, abandoned. This application Feb. 17, 1982, Ser. No. 349,557

Int. Cl.³ C08L *89/00*

U.S. Cl. 525—54.1 **12 Claims**

1. A method for coupling in a polymer latex a protein having at least one reactive nucleophilic group to polymer particles containing reactive surface hydrazide groups, said polymer particles having reactive surface hydrazide groups derived from styrenic polymer particles containing surface carboxamido groups, by using a difunctional compound having first and second functional groups, so that a polymer particle-protein conjugate is obtained, which method comprises:

(1) forming a first chemical bond between said first functional group and a reactive surface hydrazide group of the polymer particle in the latex; and

(2) forming a second chemical bond between said second functional group and a reactive nucleophilic group of the protein at a pH of about 7 to about 8.5 for a time sufficient to form the second chemical bond; and

(3) recovering the polymer particle-protein conjugate.

5. The polymer particle-protein conjugate formed by the method of claim 1.

4,421,897

ONE COMPONENT SYSTEMS BASED ON CRYSTALLINE EPOXIDE RESINS

Ferdinand Gutekunst, Richen; Hans Lehmann, Aesch, and Rolf Schmid, Gelterkinden, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 145,407, May 1, 1980, Pat. No. 4,339,571.
This application Dec. 7, 1981, Ser. No. 328,180
Claims priority, application Switzerland, May 8, 1979, 4308/79
Int. Cl.³ C08L 63/10, 63/00
U.S. Cl. 525—119 7 Claims

1. A curable, solid, one-component epoxy resin composition, which is stable on storage at room temperature, consisting essentially of

(a) one or more crystalline, solid epoxy resin, said resin having on average more than one epoxide group in the molecule and a melting point between 40° and 150° C.;

(b) 1 to 12% by weight, based on component (a), of a curing catalyst; and

(c) 5 to 30% by weight, based on the total of components (a) and (b), of a thermoplastic polymer in powder form.

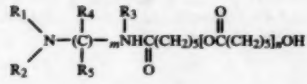
4,421,898

SULFONATED POLYMER AND COMPOSITIONS THEREOF

Robert D. Lundberg, Bridgewater, and Warren A. Thaler, Aberdeen, both of N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

Filed Dec. 21, 1981, Ser. No. 332,850
Int. Cl.³ C08L 51/04, 51/08, 51/00
U.S. Cl. 525—186 8 Claims

1. A sulfonated polymer which has about 10 to about 200 meq. of sulfonate groups per 100 grams of said sulfonated polymer, said sulfonate groups being neutralized with a polycaprolactone polymer having the formula:



wherein n=1 to 500, m=1 to 20, R_1 or R_2 is selected from the group consisting of alkyl and cycloalkyl groups having about 1 to about 20 carbon atoms, R_1 is selected from the group consisting of hydrogen, alkyl and cycloalkyl groups having about 1 to about 20 carbon atoms and aryl groups, and R_4 and R_5 are selected from the group consisting of hydrogen, alkyl, cycloalkyl and aryl groups, wherein said sulfonated polymer is formed from an elastomeric polymer selected from the group consisting of Butyl rubber and an EPDM terpolymer or from a polymer selected from the group consisting of polystyrene, poly-t-butylstyrene, polychlorostyrene and poly-2-methylstyrene, said polycaprolactone polymer having an M_n as measured by GPC of about 200 to about 50,000 and a melting point from below room temperature to about 55° C.

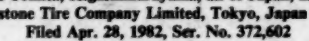
4,421,899

PNEUMATIC TIRES HAVING IMPROVED DURABILITY

Noboru Yamazaki, Tokyo; Michio Okuyama, Kodaira, and Seisuke Tomita, Higashimurayama, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

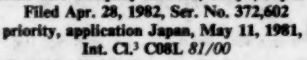
Filed Apr. 28, 1982, Ser. No. 372,602
Claims priority, application Japan, May 11, 1981, 56-69281
Int. Cl.³ C08L 81/00
U.S. Cl. 525—189 2 Claims

1. A steel cord belted radial pneumatic tire having improved durability, comprising steel cords and a rubber composition comprising a polysulfide polymer, having a polyether bond therein, of the general formula I:



(I)

wherein

x is 3 to 6, R is  , m is 3 to 5 and n is 10 to 300,

in an amount, an sulfur equivalent, of 2.0 to 10 parts by weight per 100 parts by weight of a rubber hydrocarbon consisting of at least 30% by weight of rubber selected from the group consisting of natural rubber, synthetic polyisoprene rubber and blends thereof, used as a coating rubber for the belt and/or carcass ply.

4,421,900

BLENDS OF NATURAL AND SYNTHETIC RUBBERS

Gary R. Hamed, Akron, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Apr. 16, 1982, Ser. No. 369,283
Int. Cl.³ C08L 7/00, 9/00, 9/06, 15/02
U.S. Cl. 525—218 3 Claims

1. A blend of natural and synthetic rubbers having processability and improved green strength and tack, said blend comprising:

from about 5 to 55 parts by weight of natural rubber;

from about 30 to 50 parts by weight of a conjugated diene-containing synthetic rubber having an average molecular weight of from about 50×10^3 to about 800×10^3; and

from about 5 to 50 parts by weight of a substituted acrylamide-containing synthetic rubber having an average molecular weight of from about 50×10^3 to about 500×10^3;

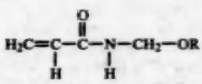
wherein said conjugated diene-containing synthetic rubber is selected from the group consisting of conjugated diene homopolymers and copolymers, prepared from conjugated diene monomers having from four to about 12 carbon atoms, with monomers containing a vinyl group selected from the group consisting of monovinyl aromatic compounds having from eight to about 20 carbon atoms and acrylic compounds having from three to about five carbon atoms including halogen-substituted compounds;

said substituted acrylamide-containing synthetic rubber comprises

from about 60 to 99.7 percent by weight of said conjugated diene monomer;

from about 0 to 39.7 percent by weight of said monomer containing a vinyl group and copolymerizable with said conjugated diene monomer; and

from about 0.3 to 10 percent by weight of an N-(alkoxymethyl)acrylamide monomer having the formula



wherein R is a straight or branched alkyl chain having from 1 to about 20 carbon atoms, the weight of each said monomer component being based upon the total weight of said substituted acrylamide-containing synthetic rubber; and

wherein said blend is based upon the following relationship:

$$A+B\geq C$$

$$C+A\geq B$$

wherein A is equal to the parts by weight of said natural rubber, B is equal to the parts by weight of said conjugated diene-containing synthetic rubber, and C is equal to the parts by weight of said substituted acrylamide-containing synthetic rubber.

4,421,901
RUBBER POWDERS

Christian Lindner, Cologne, and Karl-Heinz Ott, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jan. 4, 1982, Ser. No. 337,010

Claims priority, application Fed. Rep. of Germany, Jan. 13, 1981, 3100714

Int. Cl.³ C08F 265/04

U.S. Cl. 525—309 3 Claims

1. A process for the production of a pourable rubber powder comprising particles having an average diameter of from 0.01 to 10 mm, said process comprising completely breaking a latex of a rubber composed of a core polymer and a sheath polymer, the core and sheath differing from each other in their chemical composition and at least the sheath polymer being a diene or acrylate rubber having a glass transition temperature of below 0° C. so as to form an aqueous suspension of said rubber, then introducing into said aqueous suspension from 2 to 20% by weight, based on the rubber, of at least one vinyl monomer which forms a polymer having a glass transition temperature of above 25° C., and then polymerizing said vinyl monomer in the optional presence of a radical-forming catalyst.

4,421,902
ALKYL, POLY(OXYETHYLENE) POLY(CARBONYLOXYETHYLENE) ACRYLATE EMULSION COPOLYMERS FOR THICKENING PURPOSES

Ching-Jen Chang, Chalfont, and Travis E. Stevens, Ambler, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Sep. 30, 1982, Ser. No. 429,597

Int. Cl.³ C08L 31/06; C08F 18/14

U.S. Cl. 526—317 22 Claims

1. A copolymer polymerized from a monomer system comprising

(1) at least about 10 weight percent of a monomer or a monomer mixture selected from the group consisting of methacrylic acid, acrylic acid, itaconic acid, acryloxypropionic acid, maleic acid, fumaric acid, citraconic acid and crotonic acid;

(2) about 0.5 to 25 weight percent of at least one monomer of the formula:

$$H_2C{=}CH{-}C(O){-}O{-}(CH_2CH_2{-}C(O){-}O{-})_x(CH_2CH_2O)_nR$$

wherein:

R is selected from the group consisting of alkyl, alkylaryl and polycyclic alkyl groups having 8 to 30 carbon atoms;

x is a number from about 0.1 to about 10;

n is a number of at least 2 and has an average value of up to 60 or more, from zero up to 50% of the $(CH_2CH_2O)_n$ units being substituted for by $(CH_2CR^1HO)_m$ units wherein

R^1 is C_1–C_2 alkyl and m is a number of at least 2 and has an average value of up to 60 or more.

(3) optionally at least one copolymerizable ethylenically unsaturated monomer selected from the group consisting of compounds of the formula:

$$H_2C{=}CYZ$$

wherein

(a) Y is H and Z is COOR'', C_6H_4R''', CN, Cl, $CONH_2$, $OC(O)R''''$ OR $CH{=}CH_2$;

(b) Y is C_1–C_4 alkyl and Z is COOR'', C_6H_4R''', CN, $CONH_2$, or $CH{=}CH_2$; or

(c) Y and Z are Cl; and R'' is C_1–C_8 alkyl or C_2–C_8 hydroxyalkyl or lower alkoxy(C_2–C_8)alkyl; R''' is H, Cl, Br, or C_1–C_4 alkyl; and R'''' is C_1–C_8 alkyl; and

(4) zero to 1.0 weight percent of a polyethylenically unsaturated monomer;

4,421,903
PLATINUM COMPLEX CATALYSTS

Bruce A. Ashby, Schenectady, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed Feb. 26, 1982, Ser. No. 352,522

Int. Cl.³ B01J 31/02

U.S. Cl. 528—15 10 Claims

4. A composition comprising

(a) an organosilicon compound containing at least one ≡SiH bond;

(b) an organic compound containing an aliphatic unsaturated group, a hydroxyl group, or a mixture of such groups; and

(c) a catalytic amount of a storage-stable platinum-siloxane complex catalyst,

substantially free of inhibitory impurities, and consisting essentially of

platinum and an organosiloxane of the formula

wherein R is free of aliphatic unsaturation and is selected from alkyl radicals, cycloalkyl radicals and phenyl radicals and n is 0 or an integer of from 1 to 1000, said platinum and said organosiloxane having been chemically combined by heating, in the substantial absence of an acid binding agent,

(i) a platinum halide with

(ii) an amount of said organosiloxane sufficient to provide not less than about 0.01 gram atom of platinum per mole of vinyl content in said organosiloxane compound, and an amount of platinum in said catalyst of not substantially less than about 2.0 percent by weight, said heating being carried out for a time sufficient to insure substantially complete reaction therebetween.

4,421,904
ULTRAVIOLET CURABLE SILICONE COATING COMPOSITIONS

Richard P. Eckberg, Round Lake, and Ronald W. LaRochelle, Clifton Park, both of N.Y., assignors to General Electric Company, Waterford, N.Y.

Division of Ser. No. 63,648, Aug. 3, 1979, Pat. No. 4,279,717. This application Jun. 12, 1981, Ser. No. 272,827

Int. Cl.³ C08G 77/20

U.S. Cl. 528—27 8 Claims

1. An ultraviolet-curable epoxy functional silicone intermediate fluid composition comprising a pre-crosslinked epoxy functional dialkyl epoxy chainstopped polydialkyl-alkyl epoxy siloxane copolymer silicone fluid which comprises the reaction product of:

(a) a vinyl- or allylic- functional epoxide;

(b) a vinyl functional siloxane cross-linking fluid having a viscosity of approximately 1 to 100,000 centipoise at 25° C.;

(c) a hydrogen functional siloxane precursor fluid having a viscosity of approximately 1 to 10,000 centipoise at 25° C.; and

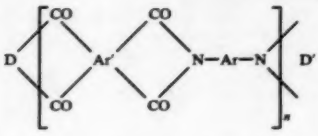
(d) an effective amount of precious metal catalyst for facilitating an addition cure hydrosilation reaction between said vinyl functional cross-linking fluid, said vinyl functional epoxide, and said hydrogen functional siloxane precursor fluid.

4,421,905
PROCESS FOR PREPARING POLYIMIDES END-CAPPED WITH ANHYDRIDE OR ISOCYANATE GROUPS

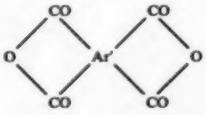
Chung J. Lee, Sheboygan, Wis., assignor to Plastics Engineering Company, Sheboygan, Wis.

Filed Sep. 20, 1982, Ser. No. 420,567
Int. Cl.³ C08G 73/10
U.S. Cl. 528—56 13 Claims

1. In the process of preparing a polyimide of the formula:



by the reaction of an aromatic dianhydride of the formula:



with an aromatic diisocyanate of the formula OCN—Ar—CNO; wherein Ar' is a tetravalent aromatic organic radical, the four carbonyl groups being attached directly to separate carbon atoms and each pair of carbonyl groups being attached to adjacent carbon atoms in the Ar' radical except that in the case of the Ar' being a naphthalene radical one or both pairs of the carbonyl groups may be attached to peri carbon atoms; Ar is a divalent aromatic radical; n is an integer of at least one; D is a radical selected from the group consisting of O< and >N—AR—NCO; and D' is a radical selected from the group consisting of OC< and

the improvement comprising the reaction of said aromatic dianhydride and said aromatic diisocyanate while in intimate contact with each other and with a metal acetylacetonate in which said metal is selected from the class consisting of Al, Co, Fe, Ni and Zr, the temperature of said reaction being in the range of 70°–150° C. and the amount of said metal acetylacetonate being in the range of 0.005–1 gram per equivalent weight of aromatic dianhydride.

4,421,906
WATER-BASED EPOXY RESIN COATING COMPOSITION

Harold G. Waddill, and Kathy B. Sellstrom, both of Austin, Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Oct. 15, 1982, Ser. No. 434,685
Int. Cl.³ C08G 59/60, 59/54
U.S. Cl. 528—111 15 Claims

1. An epoxy resin composition comprising:

(A) a diglycidyl ether comprising a condensation product of

(a) epichlorohydrin with

(b) a bisphenol A type resin or derivative thereof

which diglycidyl ether has been partially reacted with a polyoxyalkyleneamine of molecular weight of 900 to 5000; and

(B) a reactive polyamidopolyamine prepared from reaction of multi-functional carboxylic acids, esters, anhydrides and mixtures thereof with a polyfunctional amine selected from the group consisting of aliphatic, cycloaliphatic and aromatic polyfunctional amines and mixtures thereof.

4,421,907
METHOD FOR MAKING POLYETHERIMIDE

Lawrence R. Schmidt, Schenectady, and Eric M. Lovgren, Westerlo, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 21, 1983, Ser. No. 459,849
Int. Cl.³ C08G 73/10
U.S. Cl. 528—128 25 Claims

1. A process for the continuous polymerization of polyetherimide which comprises

(1) dry-blending aromatic bis(ether anhydride) and organic diamine,

(2) feeding the resulting solids into an extruder,

(3) conveying the solids to a melting stage in the extruder, where they are kneaded and melted via viscous heating at a temperature in the range of from about 50° C. to about 300° C. resulting in the production of a liquid pool,

(4) conveying the liquid of (3) to a mass transfer stage where water of reaction is vented to the atmosphere at temperatures of from 200° C. to 350° C.,

(5) conveying the resulting melt from the mass transfer stage of (4) to an advanced polymerization stage where the melt is further subjected to higher shear and intensive mixing at a temperature in the range of from 300° C. to 400° C. while being subjected to pressures of 1 atmospheres to 25 atmospheres, and

(6) and thereafter separating from the extruder polyetherimide and additional water of reaction.

4,421,908
PREPARATION OF POLYESTERS BY DIRECT CONDENSATION OF HYDROXYNAPHTHOIC ACIDS, AROMATIC DIACIDS AND AROMATIC DIOLS

Anthony J. East, Madison, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed Mar. 8, 1982, Ser. No. 355,991
Int. Cl.³ C08G 63/18, 63/60
U.S. Cl. 528—181 15 Claims

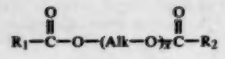
1. A process for preparing a wholly aromatic polyester comprising reacting from 10 to 90 mole percent of at least one hydroxynaphthoic acid, from 5 to 45 mole percent of at least one aromatic dicarboxylic acid and from 5 to 45 mole percent of at least one aromatic diol in the presence of a catalytic amount of a metallic compound selected from the group consisting of the salt, oxide or organo-metallic derivative of antimony, titanium, tin and germanium under polymerization reaction conditions.

4,421,909
CYANACRYLIC ACID ESTER BASED GLUES WITH A CONTENT OF A DIESTER OF A POLYOXYALKYLENE GLYCOL

Werner Gruber, Korschenbroich, and Hans-Athanas Bruhn, Garbsen, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf-Holthausen, Fed. Rep. of Germany

Division of Ser. No. 328,993, Dec. 9, 1981, Pat. No. 4,378,457.
This application Dec. 27, 1982, Ser. No. 452,881
Claims priority, application Fed. Rep. of Germany, May 27, 1981, 3121119
Int. Cl.³ C08G 83/00
U.S. Cl. 528—362 4 Claims

1. Cyanacrylic acid ester based glues with a reduced setting time comprising an α-cyanacrylic acid ester having from 1 to 12 carbon atoms in the alcohol moiety and from 0.005% to 3% by weight, based on the cyanacrylic acid ester of a polyoxyalkylene glycol diester having the formula:



wherein x is an integer from 5 to 80, Alk is an alkylene having from 2 to 4 carbon atoms, and R_1 and R_2 represent members selected from the group consisting of hydroxyl, halogen, lower alkoxy, alkoxyalkyl having from 3 to 12 carbon atoms, alkyl having from 1 to 12 carbon atoms, cyanoalkyl having from 1 to 12 carbon atoms, haloalkyl having from 1 to 12 carbon atoms, nitroalkyl having from 1 to 12 carbon atoms, cycloalkyl having from 3 to 12 carbon atoms, phenyl, nitrophenyl, halophenyl, phenylalkyl having from 1 to 6 carbon atoms in the alkyl and alkylphenyl having from 1 to 6 carbon atoms in the alkyl.

4,421,910
POLYMER STABILIZATION

Jerry O. Reed and Ronald D. Mathis, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sep. 24, 1982, Ser. No. 423,386
Int. Cl.³ C08G 75/14
U.S. Cl. 528—388 **14 Claims**

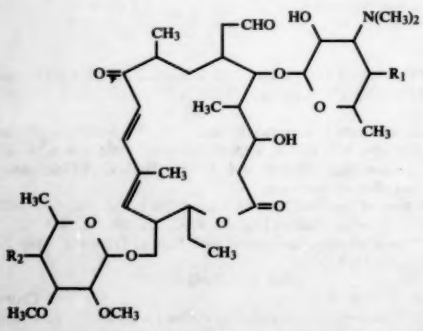
1. A polymer composition exhibiting increase melt viscosity when subjected to heat comprising a poly(arylene sulfide) polymer containing a finite, but small effective amount, sufficient to promote polymer curing and cross-linking of at least one metal salt of dihydrocarbyl dithiophosphinic acid.

4,421,911
DEOXYDESMYCOSIN

Tatsuro Fujiwara, Shizuoka; Eiichi Honda, Mishima; Hideo Sakakibara, Mishima, and Takao Hirano, Shizuoka, all of Japan, assignors to Toyo Jozo Kabushiki Kaisha, Shizuoka, Japan

Filed Mar. 16, 1982, Ser. No. 358,805
Claims priority, application Japan, Mar. 16, 1981, 56-38375
Int. Cl.³ C07H 17/08; A61K 31/71
U.S. Cl. 536—7.1 **4 Claims**

1. A compound of the formula



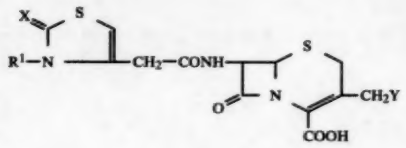
wherein R_1 and R_2 are hydrogen or hydroxy and at least one of R_1 and R_2 is hydrogen, or a pharmaceutically acceptable salt thereof.

4,421,912
CEPHALOSPORIN DERIVATIVES

Mitsuo Numata, Osaka; Isao Mimamida, Kyoto; Masayoshi Yamaoka; Mitsuru Shiraishi, both of Osaka, and Toshio Miyawaki, Hyogo, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Division of Ser. No. 863,719, Dec. 23, 1977, Pat. No. 4,379,924, which is a division of Ser. No. 534,782, Dec. 20, 1974, Pat. No. 4,080,498. This application Feb. 18, 1981, Ser. No. 235,609
Claims priority, application Japan, Dec. 25, 1973, 48-1521; Feb. 20, 1974, 49-20752; Apr. 15, 1974, 49-42574; Jul. 17, 1974, 49-82623; Nov. 13, 1974, 49-131381
The portion of the term of this patent subsequent to Mar. 21, 1995, has been disclaimed.
Int. Cl.³ C07D 501/34
U.S. Cl. 544—27 **29 Claims**

1. A compound of the formula:



Wherein R^1 represents hydrogen or an alkyl group, X represents oxygen or sulfur or a group of formula NR^2 where R^2 is hydrogen or an alkyl group and in the case of alkyl, R^2 may form a ring jointed with R^1, and Y represents acetoxy group or a group of formula $—SR^3$ where R^3 is a nitrogen-containing heterocyclic group, or a pharmaceutically acceptable salt thereof.

4,421,913
SEPARATION OF TRIPHENYLPHOSPHINE OXIDE FROM METHOTREXATE ESTER AND PURIFICATION OF SAID ESTER

James A. Ellard, and James A. Webster, both of Dayton, Ohio, assignors to The United States of America as represented by the Secretary of the Department of Health and Human Services, Washington, D.C.

Continuation of Ser. No. 143,129, Apr. 23, 1980, abandoned. This application Dec. 11, 1981, Ser. No. 329,869
Int. Cl.³ C07D 475/08
U.S. Cl. 544—260 **2 Claims**

1. In the preparation of methotrexate by the Ellard process, which involves the coupling of dimethyl-N-[4-(methylamino)-benzoyl]-L-glutamate with a 6-(bromomethyl)-2,4-diaminopteridine derivative to form the methotrexate ester, and further in a step involving the quenching and separation of the methotrexate ester, utilizing a biphase solution and the use of an organic solvent selected from the group consisting of benzene, toluene, and xylene to form a two-phase system wherein the methotrexate ester is recovered in the aqueous phase and a byproduct triphenylphosphine oxide is separated and recovered in the organic solvent.

4,421,914
THIAZOLO[3,2-a]PYRIMIDINES, DERIVATIVES THEREOF, PROCESSES FOR PRODUCTION THEREOF, AND PHARMACEUTICAL USE THEREOF

Noriaki Okamura, Chofu; Takeshi Toru, Hachioji; Takeo Oba, Hino; Toshio Tanaka, Hino; Kiyoshi Bannai, Hino; Kenzo Watanabe, Hino; Seizi Kurozumi, Kokubunji; Tatsuyuki Naruchi, Hino, and Keiji Komoriya, Hachioji, all of Japan, assignors to Teijin Limited, Tokyo, Japan

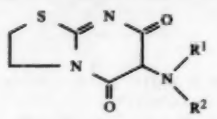
Filed Oct. 14, 1981, Ser. No. 311,329

Claims priority, application Japan, Oct. 15, 1980, 55-142869; Aug. 10, 1981, 56-124173

Int. Cl.³ C07D *513/14;* A61K *31/505*

U.S. Cl. 544—278 2 Claims

1. A compound selected from thiazolo[3,2-a]pyrimidines represented by the following general formula:



(I)

wherein R^1 and R^2 are identical or different, and each represents a hydrogen atom, an alkyl group having 1 to 10 carbon atoms, an alkenyl group having 3to 10 carbon atoms, a substituted or unsubstituted phenyl group, a substituted or unsubstituted cycloaliphatic group having 3 to 8 carbon atoms, a substituted or unsubstituted phenylalkyl group or a substituted or unsubstituted acyl group having 2 to 7 carbon atoms, each of the above-mentioned substituted groups being substituted by a substituent selected from the group consisting of a halogen atom, a hydroxy group, a C_{1-4} alkyl group which may be substituted by one or more halogen atoms, a C_{1-4} alkoxy group which may be substituted by one or more halogen atoms, a nitrile group, a carboxyl group, and an alkoxycarbonyl group having 2 to 7 carbon atoms, provided that R^1 and R^2 are not simultaneously hydrogen atoms or substituted or unsubstituted acyl groups having 2 to 7 carbon atoms, or their enolate derivatives, or acid addition salts of these compounds.

4,421,915
POLYMERIZABLE ETHYLENICALLY UNSATURATED AMIDE COMPOUNDS

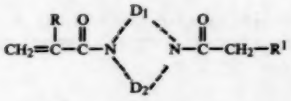
Ignazio S. Ponticello; Kenneth R. Hollister, and Richard C. Tuites, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 157,600, Jun. 9, 1980, Pat. No. 4,346,231, which is a division of Ser. No. 85,138, Oct. 15, 1979, Pat. No. 4,247,673, which is a division of Ser. No. 971,463, Dec. 20, 1978, Pat. No. 4,215,195. This application Apr. 19, 1982, Ser. No. 370,002

Int. Cl.³ C07D *241/04*

U.S. Cl. 544—387 5 Claims

1. A compound of the formula:



wherein R is hydrogen or methyl; R^1 is cyano or

wherein R^2 is alkyl of 1 to 6 carbon atoms; and D_1 and D_2 together are the carbon atoms necessary to complete a six-membered saturated ring.

4,421,916
INTERMEDIATES FOR OCTAHYDROBENZOFURO[3,2-E]ISOQUINOLINES

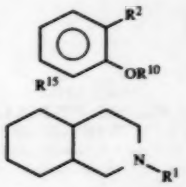
Ashokkumar B. Shenvi, Wilmington, Del., assignor to E. I. Du Pont de Nemours & Co., Wilmington, Del.

Filed Dec. 28, 1981, Ser. No. 334,839

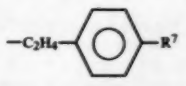
Int. Cl.³ C07D *217/04*

U.S. Cl. 546—14 2 Claims

1. The compound, Compound X, having the formula:



wherein R^1 is C_{1-10} alkyl, $—CH_2R^6$ or



R_2 is —H or C_{1-12} alkoxy;

R^6 is C_{3-6} cycloalkyl, phenyl or 2-tetrahydrofuryl optionally substituted with a methyl group;

R^7 is —H or C_{1-3} alkyl;

R^{10} is C_{1-10} alkyl; and

R^{15} is C_{1-3} alkyl carbonyloxy, —OH, or $—OCH(R^{12})OR^{13}$ wherein R^{12} and R^{13} are —H or C_{1-3} alkyl and taken together may form a C_{2-5} alkylene group, optionally substituted with a methyl group, except that R^{12} and R^{13} may not both be —H, or R^{15} may be R^{11} or R^{14} wherein R^{11} is —Cl, —Br, —I, p—$MeC_6H_4SO_3$—$MeSO_3$ and R^{14} is Me_3SiO—or t—$BuMe_2SiO$—.

4,421,917
DERIVATIVES OF 2-UREIDO-7-PHENYLHEXAHYDROBENZO[a]-QUINOLIZINES

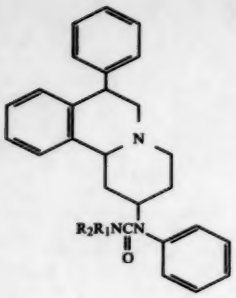
Bruce E. Maryanoff, New Hope, and David F. McComsey, Warminster, both of Pa., assignors to McNeilab, Inc., Fort Washington, Pa.

Filed Jul. 16, 1982, Ser. No. 399,029

Int. Cl.³ C07D *455/06*

U.S. Cl. 546—95 5 Claims

1. A compound selected from the group consisting of compounds of the formula:



(I)

and non-toxic, pharmaceutically-acceptable acid addition salts thereof, wherein R_1 is H or a C_{1-3} lower alkyl and R_2 is a C_{1-6} lower alkyl.

4,421,918

PROCESS FOR THE PREPARATION OF 7-CHLORO-1,2,3,4-TETRAHYDROQUINOLIN-4-ONE

Michel Baudouin, St. Fons, and Hubert Linares, Caluire, both of France, assignors to Rhone-Poulenc Sante, Courbevoie, France

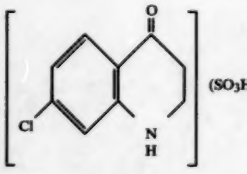
Filed Jan. 15, 1982, Ser. No. 339,704

Claims priority, application France, Jan. 16, 1981, 81 00763

Int. Cl.³ C07D *215/22*

U.S. Cl. 546—153 **4 Claims**

1. A process for the preparation of 7-chloro-1,2,3,4-tetrahydroquinolin-4-one which comprises cyclising 3-m-chloroanilinopropionic acid by means of an oleum, then desulphonating the intermediate aromatic sulphonic acids of the formula:



(wherein n is 1 or 2) by means of dilute sulphuric acid, and then isolating the 7-chloro-1,2,3,4-tetrahydroquinolin-4-one obtained.

4,421,919

4-OXIMINO-1,2,3,4-TETRAHYDROQUINOLINE DERIVATIVES

Susumu Jinbo; Shoichi Kohno, and Koichi Kashima, all of Tokyo, Japan, assignors to Hodogaya Chemical Co., Ltd. and Mochida Seiyaku Kabushiki Kaisha, both of Tokyo, Japan

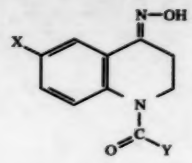
Filed Jul. 7, 1981, Ser. No. 281,243

Claims priority, application Japan, Jul. 28, 1980, 55-103272; Jul. 28, 1980, 55-103273; Mar. 19, 1981, 56-39909; Mar. 19, 1981, 56-39910; Mar. 19, 1981, 56-39911

Int. Cl.³ C07D *215/48, 215/42;* A61K *31/47*

U.S. Cl. 546—159 **5 Claims**

1. A 4-oximino-1,2,3,4-tetrahydroquinoline derivative of the formula (I):



wherein X represents a halogen, and Y represents hydrogen, a straight-chain or branched-chain alkyl group of 1 to 9 carbon atoms, a trifluoromethyl group, a phenylmethyl group, a phenylethylene group, a pyridyl group, a straight-chain or branched-chain alkoxy group of 1 to 3 carbon atoms, an amino group substituted by an alky group of 1 to 2 carbon atoms, or a phenylamino group.

4,421,920

PROCESS FOR THE PREPARATION OF 4-AMINO-CHLOROQUINOLINES

Michel Baudouin, St. Fons, and Daniel Michelet, Tassin, both of France, assignors to Rhone-Poulenc Sante, Courbevoie, France

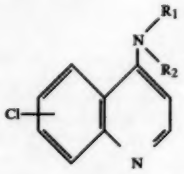
Filed Jan. 15, 1982, Ser. No. 339,722

Claims priority, application France, Jan. 16, 1981, 8100765

Int. Cl.³ C07D *215/42, 215/44, 215/46*

U.S. Cl. 546—163 **11 Claims**

1. A process for the preparation of a 4-amino-chloroquinoline of the formula:

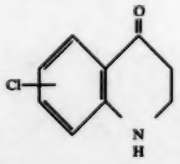


(I)

in which R_1 represents hydrogen or alkyl of 1 through 5 carbon atoms, and R_2 represents alkyl of 1 through 5 carbon atoms, alkyl of 1 through 5 carbon atoms substituted by a dialkylamino group of which each alkyl radical contains 1 through 4 carbon atoms, phenyl, or phenyl substituted by one or more radicals selected from carboxy and hydroxy and alkyl radicals of 1 through 4 carbon atoms optionally substituted by a dialkylamino group of which each alkyl radical contains 1 through 4 carbon atoms, which comprises carrying out the condensation of an amine of the general formula:

(III)

in which R_1 and R_2 are as hereinbefore defined, with a chloro-1,2,3,4-tetrahydroquinolin-4-one of the formula:



(II)

with aromatisation of the tetrahydroquinoline, the reaction being carried out in the presence of a ruthenium based catalyst on a support.

4,421,921

PROCESS FOR THE PRODUCTION OF 3-PICOLINE

James I. Grayson, Visp, and Rolf Dinkel, Münchenstein, both of Switzerland, assignors to Lonza Ltd., Gampel, Switzerland

Filed Sep. 8, 1982, Ser. No. 415,835

Claims priority, application Switzerland, Sep. 29, 1981, 6250/81

Int. Cl.³ C07D *213/09, 213/12, 213/10*

U.S. Cl. 546—251 **13 Claims**

1. Process for the production of 3-picoline comprising reacting acrolein or a mixture of acrolein and formaldehyde in the liquid aqueous phase at a temperature of 180° to 280° C. in a closed vessel in the presence of ammonia and/or ammonium ions and in the presence of anions of an inorganic and/acid or organic acid, which has an acid dissociation constant of 10^{6} to 10^{-12} at 20° C.

4,421,922

PROCESS FOR THE PRODUCTION OF TETRONIC ACID

Raimund Miller, Hackensack, N.J., and Leander Tenud, Visp, Switzerland, assignors to Lonza Ltd., Gampel, Switzerland

Filed Jun. 14, 1982, Ser. No. 388,431

Claims priority, application Switzerland, Jun. 17, 1981, 3983/81

Int. Cl.³ C07D *307/60*

U.S. Cl. 549—313 **22 Claims**

1. Process for the production of tetronic acid from 4-haloacetoacetic ester comprising converting a 4-haloacetoacetic ester into the corresponding 4-benzyloxyacetoacetic ester, forming the 4-benzyloxyacetoacetic ester by hydrogenolysis into the corresponding 4-hydroxyacetoacetic ester, and converting the 4-hydroxyacetoacetic ester by treatment with acid into tetronic acid.

4,421,923

RING SUBSTITUTED CROWN ETHERS AND METHOD OF PRODUCING SAME

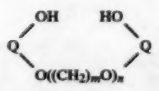
Richard A. Bartsch, Lubbock, Tex., assignor to PCR Research Chemicals, Inc., Gainesville, Fla.

Filed Dec. 12, 1980, Ser. No. 215,680

Int. Cl.³ C07D *323/00*

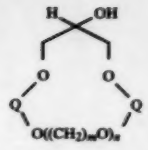
U.S. Cl. 549—349 **6 Claims**

1. A process for making a macrocyclic polyether which comprises reacting in an aqueous medium a dihydroxy ether having the general formula:



(A)

wherein Q is a bivalent organic cyclic radical containing at least 6 carbon atoms and selected from phenylene, naphthylene, phenyl phenylene and mono or poly-substituted phenylene, naphthylene, and phenyl phenylene where the substituent group is selected from hydrocarbyl groups containing from 1 to 12 carbon atoms, halogen, alkoxy groups containing from 1-6carbon atoms, acetyl, acetonyl, and nitro, vicinal carbon atoms of which are directly attached to oxygen atoms in the dihydroxy ether; and m and n are integers selected from 1, 2 and 3, with an epihalohydrin in the presence of an alkali metal hydroxide and recovering a product having the general formula:



(B)

wherein Q, m, and n have the meanings ascribed above.

4,421,924

ASCORBIC ACID INTERMEDIATES AND THEIR PREPARATION

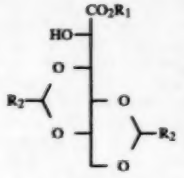
Thomas C. Crawford, County of New London, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 146,239, May 5, 1980, Pat. No. 4,283,340, which is a division of Ser. No. 805,880, Jun. 13, 1977, Pat. No. 4,232,168. This application Apr. 24, 1981, Ser. No. 257,208

Int. Cl.³ C07D *407/00*

U.S. Cl. 549—370 **1 Claim**

1. A process for preparing a 3,5:4,6 protected derivative of gulonic acid which comprises contacting D- or L-gulono-1,4-lactone with either at least two equivalents of an aldehyde dialkyl acetal of the formula $R_2CH(OR_1)_2$ or at least two equivalents of an aldehyde of the formula R_2CHO and at least one equivalent of an alcohol of the formula R_1OH in the presence of an acid having a pK_a less than 3 at a temperature of from about 0° to about 70° C. to obtain a compound of the formula



wherein R_1 is alkyl having 1 to 6 carbon atoms and R_2 is alkyl having 1 to 6 carbon atoms, phenyl or monosubstituted or disubstituted phenyl wherein said substituents are alkyl having 1 to 6 carbon atoms, alkoxy having 1 to 6 carbon atoms, chloro bromo, fluoro or nitro.

4,421,925

4-ALKOXY-1,3-DIOXANE-5-CARBONITRILES AND PROCESS FOR PREPARING THE SAME

Sumio Umemura; Kozo Fujii; Keigo Nishihira; Hiroyuki Sawada; Shuji Tanaka; Mamoru Nakai; Hiroshi Yoshida, and Yoshiaki Kuroki, all of Ube, Japan, assignors to Ube Industries, Ltd., Ube, Japan

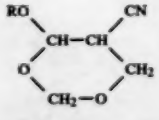
Filed May 5, 1982, Ser. No. 375,203

Claims priority, application Japan, May 19, 1981, 56-74194; Sep. 30, 1981, 56-153814; Oct. 12, 1981, 56-160986

Int. Cl.³ C07D *319/06*

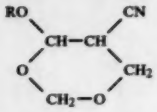
U.S. Cl. 549—372 **11 Claims**

1. A 4-alkoxy-1,3-dioxane-5-carbonitrile represented by the formula



wherein R represents a lower-alkyl group.

3. A process for preparing a 4-alkoxy-1,3-dioxane-5-carbonitrile of the formula



wherein R is a lower-alkyl group,

which comprises reacting at a temperature between −20° C. and 300° C. a 3-alkoxy-2-propenenitrile of the formula RO—CH=CH—CN with formaldehyde in the presence of an acid catalyst, said formaldehyde being in an amount of 1 to 20 moles in terms of the aldehyde based on one mole of the 3-alkoxy-2-propenenitrile.

4,421,926

PROCESS FOR CO-ALKOXYLATION OF HALOSILANES AND SEPARATION OF THE RESULTING PRODUCTS

Luisito A. Tolentino, Ballston Lake, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed Jun. 28, 1982, Ser. No. 393,011
Int. Cl.³ C07F 7/08, 7/18, 7/04
U.S. Cl. 556—471 44 Claims

1. A process for converting a mixture of at least two different halosilanes having the general formula, R_nSiX_{4-n} to at least two different alkoxysilanes having the formula, $R_nSi(OR')_{4-n}$, where R and R' are selected from the group consisting of saturated or unsaturated alkyl radicals of 1 to about 8 carbon atoms, substituted saturated or unsaturated alkyl radicals of 1 to about 8 carbon atoms, cyclic carbon groups of about 4 to about 10 carbon atoms, substituted cyclic carbon groups of about 4 to about 10 carbon atoms, and except for R', hydrogen; X is halogen; and n is 0 to 3; and separating the alkoxysilanes, comprising:

(a) charging a reboiler equipped with a column with at least one compound selected from the group consisting of an alcohol having the formula, R'OH, and, optionally, at least one halosilane having the formula, R_nSiX_{4-n}, or the corresponding alkoxysilane having the formula $R_nSi(OR')_{4-n}$; where R and R' are selected from the group consisting of saturated or unsaturated alkyl radicals of 1 to about 8 carbon atoms, substituted saturated or unsaturated alkyl radicals of 1 to about 8 carbon atoms, cyclic carbon groups of about 4 to about 10 carbon atoms, substituted cyclic carbon groups of about 4 to about 10 carbon atoms, and except for R', hydrogen; X is halogen; and n is 1 to 3; the lower end of the column being connected to the reboiler;

(b) heating the reboiler at a temperature to cause the contents of the reboiler to reflux in the column;

(c) feeding at least two halosilanes having the formula, R_nSiX_{4-n}, where R, X and n are defined above, into the column;

(d) introducing an alcohol having the formula, R'OH, where R' is defined above, into the column at a point wherein the alcohol passes into a reaction zone in the column, and the alcohol and the halosilanes react in the reaction zone to form the corresponding alkoxysilanes and hydrogen chloride;

(e) removing the hydrogen chloride;

(f) collecting at least two alkoxysilanes; and

(g) separating the alkoxysilanes.

4,421,927

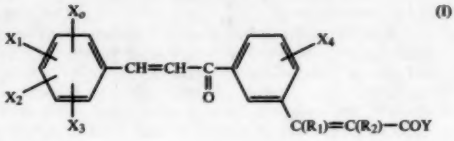
NEW CINNAMOYL-CINNAMIC ACID DERIVATIVE, AND ITS USE AS PHARMACEUTICAL

Francois Picart, Dijon, France, assignor to Societe de Recherches Industrielles (S.O.R.I.), Paris, France

Filed Oct. 22, 1981, Ser. No. 314,041
Claims priority, application France, Oct. 23, 1980, 80 22693
Int. Cl.³ C07C 69/76
U.S. Cl. 424—248.55 6 Claims

1. A new cinnamoyl-cinnamic acid derivative, characterised in that it is selected from the group consisting of:

(i) the m-cinnamoyl-cinnamic acid derivatives of formula:



(I)

wherein:

X_0, X_1, X_2, X_3, X_4, are identical or different, and are selected from the group consisting of hydrogen, a halogen, a lower alkyl group, a lower alkoxy group, the group NRR' (where R and R', identical or different, are selected from the group consisting of hydrogen or a lower alkyl group), the group NO_2, CF_3 or OH;

R_1 represents hydrogen or a lower alkyl group;

R_2 represents hydrogen or the methyl group;

Y represents a group OH, OR_3 (where R_3 is a lower alkyl group), NRR' (where R and R' are defined as hereinabove) or the group $O(CH_2)_nNR_4R_5$ (where n is an integer of value 1 to 5- and preferably 2 or 3-; and NR_4R_5 is selected from the group consisting of the pyrrolyl, imidazolyl, pyrazolyl, imidazolidinyl, pyrrolidinyl, pyrazolidinyl, piperidyl, piperazinyl-morpholinyl, homopiperidinyl, 4-methylpiperidyl, 4-methyl-piperazinyl, 4-phenyl-piperazinyl, 4-p-chlorophenylpiperazinyl and 4-β-hyroxyethyl-piperazinyl groups;)

(ii) their geometrical isomers; and

(iii) their salts.

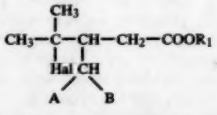
4,421,928

4-METHYL-3-FORMYL-PENTANOIC ACID ESTERS

Jacques Martel, Bondy; Jean Tessier, Vincennes, and Jean-Pierre Demoute, Montreuil-sous-Bois, all of France, assignors to Roussel Uclaf, Paris, France

Filed Feb. 25, 1982, Ser. No. 352,259
Claims priority, application France, Feb. 26, 1981, 81 03832
Int. Cl.³ C07C 69/708, 69/716
U.S. Cl. 560—177 5 Claims

1. A compound of the formula



I

wherein Hal is a halogen, R_1 is 1 to 12 carbon atoms and A and B are =O or A is halogen and B is OR_2 and R_2 is alkyl of 1 to 12 carbon atoms.

4,421,929

TETRACARBOXYLIC ACIDS

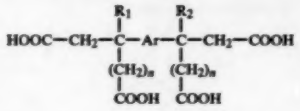
Edmund P. Woo, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 113,896, Jan. 21, 1980, abandoned, which is a continuation-in-part of Ser. No. 53,672, Jul. 2, 1979, abandoned. This application Dec. 2, 1981, Ser. No. 326,717

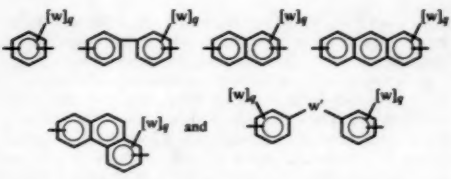
Int. Cl.³ C07C *59/00, 65/00*

U.S. Cl. 562—465 8 Claims

1. A tetracarboxylic acid compound of the formula



wherein Ar is a C_{6-20} arylene radical selected from the group consisting of:



wherein w in each occurrence is halo, nitro, or a C_{1-10} radical selected from alkyl, aryl alkaryl, aralkyl, haloalkyl, haloaryl, aryloxy and alkoxy; q is an integer from zero to 4; and w' is oxygen, sulfur, alkylene, oxyalkylene, alkylenedioxy, or polyoxyalkylene; R_1, R_2 individually are hydrogen or alkyl, aryl, aralkyl, or alkaryl radicals containing up to 10 carbon atoms; and both n's are zeros or ones.

4,421,930

PROCESS FOR PREPARING A PUMPABLE SURFACE-ACTIVE PRODUCT BASED ON POLYESTER ACETIC ACID

Nicolaas A. I. van Paassen, Bodegraven, and Hermanus C. H. van Riel, Waddinxveen, both of Netherlands, assignors to Chem-Y Fabriek van Chemische Produkten B.V., Bodegraven, Netherlands

Filed Aug. 18, 1981, Ser. No. 294,041

Claims priority, application Fed. Rep. of Germany, Aug. 26, 1980, 3032061

Int. Cl.³ C07C *59/66, 59/10*

U.S. Cl. 562—470 8 Claims

1. A process for preparing a pumpable liquid surface - active product, based on polyether acetic acid, which comprises

to a crude reaction mixture, obtained in extremely viscous, pasty or almost solid form by reacting, in a non-aqueous alkaline medium, an adduct of the formula RO—$(C_2H_4O)_xH$ with a compound Hal—CH_2COOM, wherein R is a hydrophobic, aliphatic or aliphatic-aromatic residue, x is a number having an average value of 0.5–10, Hal is a halogen atom and M represents an alkali metal,

adding an amount in the range of 1–10% of water effective to obtain a substantial decrease in viscosity without the occurrence of gelling and such an amount of acid that a 10 percent aqueous solution of the product shows a pH in the range of 4–7, said amount of acid being insufficient to cause phase separation, to provide said pumpable liquid surface-active product.

4,421,931

PREPARATION OF ANTHRANILIC ACID AMIDES

Peter Tonne, Neustadt; Winfried Ludwig, Gruenstadt; Gerhard Kilpper, Carlsberg, and Johannes Grimmer, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

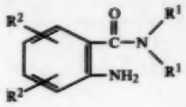
Filed Jan. 11, 1982, Ser. No. 338,243

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1981, 3103563

Int. Cl.³ C07C *102/04, 103/28, 103/76*

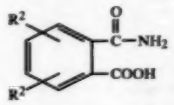
U.S. Cl. 564—139 13 Claims

1. A process for the preparation of an anthranilic acid amide of the formula



I

where the individual radicals R^1 and R^2 can be identical or different and each is hydrogen or an aliphatic radical, R^1 can also be cycloaliphatic, araliphatic or aromatic radical and R^2 can also be halogen or alkoxy, wherein a phthalamic acid of the formula



II

where R^2 has the above meaning, is reacted with a hypohalite and ammonia or an amine of the formula

III

where R^1 has the above meaning, by dissolving the starting material II in aqueous alkali, mixing the solution with amidosulfonic acid, sulfamide and/or potassium iodide as a catalyst and a hypohalite, leaving the mixture to stand for from 1 to 1,000 seconds, then introducing the amine and thereafter adding acid until the pH of the mixture is from 6 to 8.

4,421,932

MANUFACTURE OF QUATERNARY AMMONIUM COMPOUNDS

Horst Rutzen, Langenfeld, and Manfred Petzold, Duesseldorf-Holthausen, both of Fed. Rep. of Germany, assignors to Henkel KGaA, Duesseldorf, Fed. Rep. of Germany

Filed Apr. 19, 1982, Ser. No. 369,810

Claims priority, application Fed. Rep. of Germany, Sep. 15, 1981, 3136564

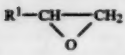
Int. Cl.³ C07C *89/00*

U.S. Cl. 564—292 10 Claims

1. A process for the manufacture of a quaternary ammonium compound comprising the steps of:

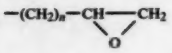
(a) reacting in the presence of water a tertiary amine which is from about 50 to about 90 mole percent in the form of a salt of an inorganic or organic acid with a compound containing a terminal epoxy group to form a quaternary ammonium compound, wherein the compound containing a terminal epoxy group is selected from the group consisting of

(i) a compound of the formula



(I)

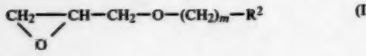
wherein R^1 is a straight or branched chain aliphatic hydrocarbon group having 1 to 21 carbon atoms or a group of the formula



(II)

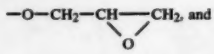
wherein n is an integer of from 4 to 16, and

(ii) a compound of the formula



(III)

wherein m is an integer of from 1 to 10, and R^2 is hydrogen, or a straight or branched chain aliphatic hydrocarbon group having from 1 to 24 carbon atoms, or a group of the formula



(IV)

wherein the tertiary amine contains at least one straight or branched chain alkyl, hydroxyalkyl or aralkyl group or an N-heterocyclic group containing the nitrogen atom of the tertiary amine in the ring structure, in which such group contains less than 10 carbon atoms; and

(b) adding to the reaction mixture at the end of the reaction an inorganic acid, an acid salt, or an organic acid in an amount required for complete salt formation of the quaternary ammonium compound.

4,421,933

PROCESS FOR THE CO-PRODUCTION OF KETONES AND MONO-OLEFINS

Johannes A. M. Van Broekhoven, and Christopher S. John, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Jul. 2, 1982, Ser. No. 394,598

Int. Cl.³ C07C *45/00*

U.S. Cl. 568—403 **10 Claims**

1. Process for the co-production of ketones and mono-olefins from secondary lower alcohols and cycloalkanols and conjugated di-olefins containing from 4 to 6 carbon atoms which comprises contacting in a reaction zone a feed mixture of said conjugated di-olefin and said secondary alcohol in a volume ratio of di-olefin to alcohol in the range from 1:30 to 2:1 at a temperature in the range from 70° to 130° C. with a supported heterogeneous copper-containing catalytic system containing between 1 and 35%w copper on carrier and withdrawing a ketone and mono-olefin-containing reaction product from said zone.

4,421,934

PROCESS FOR THE PREPARATION OF δ-ETHYLENIC CARBONYL COMPOUNDS

Norbert Bluthe; Jacques Gore, both of Calluire, and Max Malacria, Villeurbanne, all of France, assignors to Rhone-Poulenc Sante, Courbevoie, France

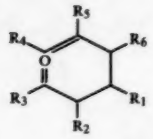
Filed Mar. 5, 1982, Ser. No. 354,145

Claims priority, application France, Mar. 9, 1981, 81 04600; Jun. 23, 1981, 01 12300

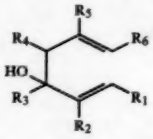
Int. Cl.³ C07C *45/51*

U.S. Cl. 568—341 **8 Claims**

1. A process for the preparation of δ-ethylenic carbonyl compounds of the general formula



in which R_1, R_2, R_4, R_5 and R_6, which are identical or different, represent hydrogen or an acyclic hydrocarbon radical containing 1 to 20 carbon atoms, the chain of which may contain one or more double or triple bonds, and R_3 represents an acyclic hydrocarbon radical containing 1 to 20 carbon atoms, the chain of which may contain one or more double or triple bonds, it being understood that R_1 and R_3 can together form a trimethylene radical, or alternatively that R_3 and R_4 can together represent an alkylene radical $—(CH_2)_n—$, in which one or more carbon atoms may be substituted by one or more alkyl radicals containing 1 to 4 carbon atoms, and in which n represents an integer from 3 through 20 inclusive, by the rearrangement of a diethylenic alcohol of the general formula:



in which R_1, R_2, R_3, R_4, R_5 and R_6 are defined as above, which comprises carrying out the rearrangement at a temperature from −40° C. to 80° C., in the presence of a substantially stoichiometric amount of a mercuric salt, selected from the chloride, the acetate and the trifluoroacetate, or in the presence of a catalytic amount of a mercuric salt and a substantially stoichiometric amount of a lithium salt, and isolating the product obtained, if necessary after the reaction mixture has been treated with, as reducing agent, an alkali metal borohydride in a basic medium.

4,421,935

PROCESS FOR THE PREPARATION OF BICYCLO [2.2.] HEPTENE DERIVATIVES

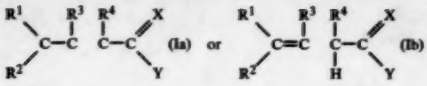
Pieter A. Verbrugge, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed May 3, 1982, Ser. No. 373,832

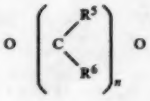
Int. Cl.³ C07C *45/69*

U.S. Cl. 568—343 **10 Claims**

1. Process for the preparation of Diels-Alder type adducts which comprises reacting at a temperature less than about 25° C. a compound according to the general formula



or the corresponding hydrated derivative, wherein R^1, R^2, and R^4, which may be the same or different, each represents a hydrogen atom or a lower alkyl group; R^3 represents a lower alkyl group; X represents an oxygen or sulphur atom or a group $(O—CR^5R^6R^7)_2$ or



wherein R^5, R^6 and R^7, which may be the same or different, each represents a hydrogen atom or a lower alkyl group; n is an integer of from 2 up to 5 and Y represents a hydrogen atom, an alkyl or alkenyl group or Y and R^2 together form an alkylene group which may contain one or more hydrocarbyl substituents, with a cyclopentadiene and/or an oligomer thereof in the presence of an aqueous solution of a strong proton donor having a conjugate base with a low nucleophilicity, wherein the concentration of said donor is at least 25% of the reaction mixture, and wherein said donor is selected from sulphuric acid, phosphoric acid, perchloric acid, methane sulphonic acid, trihalomethane sulphonic acid and an aromatic sulphonic acid.

in which R_1, R_2 and R_3 are selected from hydrogen, alkyl or alkoxyalkyl radicals, said aliphatic alcohol having 4 to 18 carbon atoms, and feeding the vaporized alcohol into a lower section of the column reactor at a rate of 2 to 4 moles of alcohol per mole of alkali metal hydroxide introduced into the column reactor;

(c) Reacting the aliphatic alcohol with the alkali metal hydroxide in the column reactor;

(d) Concurrently removing water from the alkali metal hydroxide solution and the alkoxide formation from an upper section of the column reactor in the form of an azeotrope;

(e) Continuously condensing and separating the azeotrope into an alcohol phase and a water phase, the water phase being removed from the process and the alcohol phase being returned to the column reactor;

(f) Recovering a substantially anhydrous reaction product comprising alkoxide product and aliphatic alcohol from a lower section of the column reactor while simultaneously maintaining a non-oxidizing atmosphere throughout the conduct of steps a through f.

4,421,936

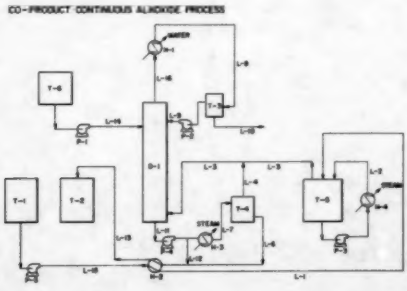
CONTINUOUS ALKOXIDATION PROCESS

Harry M. Smith, St. Albans, and Raymond D. Williams, Elsanor, both of W. Va., assignors to FMC Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 366,262, Apr. 7, 1982, abandoned. This application Mar. 31, 1983, Ser. No. 480,977

Int. Cl.³ C07C *29/70, 43/13*

U.S. Cl. 568—678 **6 Claims**



1. A continuous process for producing alkali metal alkoxides comprising the steps:

(a) Continuously introducing an aqueous solution of an alkali metal hydroxide into an upper section of a column-reactor;

(b) Continuously vaporizing an aliphatic alcohol of the formula

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4,421,937

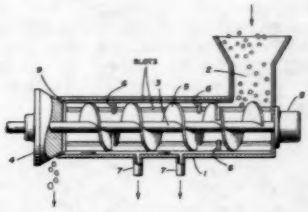
CRYSTAL PURIFICATION

Dan K. Lynch, Kirkwood, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Jan. 4, 1982, Ser. No. 336,549

Int. Cl.³ C07C *37/84*

U.S. Cl. 568—708 **5 Claims**



1. A process for the continuous separation of a feed mixture of 50–99 weight percent crystals of aromatic organic compounds selected from the group consisting of para-dichlorobenzene, para-nitrochlorobenzene, para-chlorophenol, 2,4-dichlorophenol, ortho-nitrophenol, para-nitrophenol, and trans-stilbene and 1–50 weight percent liquid comprising continuously feeding the mixture into a screw type press having a feed orifice, a substantially closed compression channel having drainage means and an ejection orifice, thereby subjecting the mixture to a pressure sufficient to substantially reduce interstitial space between crystals while maintaining the crystals at a temperature below their melting point, causing drainage and removal of a substantial portion of the liquid and leaving in the compression channel purified crystals with compressed interstitial space; and continuously ejecting the purified crystals.

4,421,938

PREPARATION OF ALDEHYDES

Hassan Windawi, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Apr. 5, 1982, Ser. No. 365,718
Int. Cl.³ C07C 45/29
U.S. Cl. 568—474 12 Claims

1. In a process for the conversion of an aliphatic alcohol containing from 1 to about 10 carbon atoms in the aliphatic chain to the corresponding aldehyde by reaction of the alcohol with an oxygen-containing gas at a temperature in the range of from about 200° C. to about 400° C., a pressure in the range of from about atmospheric to about 50 atmospheres and a liquid hourly space velocity in the range of from about 1 to about 10, the improvement which comprises reacting said alcohol and gas in the presence of a catalyst comprising at least two oxides of metals selected from the group consisting of molybdenum, tungsten, cobalt, nickel, manganese, iron and chromium, one of said oxides being molybdenum oxide or tungsten oxide, composited on a high surface area support selected from the group consisting of gamma-alumina, eta-alumina, theta-alumina, silica, zeolites, alumina-silica, alumina-zirconia, alumina-magnesia and alumina-zirconium-silica.

4,421,939

PRODUCTION OF ETHANOL FROM ACETIC ACID

Ben W. Kiff, Lehigh Acres, Fla., and David J. Schreck, Cross Lanes, W. Va., assignors to Union Carbide Corporation, Danbury, Conn.

Filed Oct. 15, 1982, Ser. No. 434,562
Int. Cl.³ C07C 31/08, 29/136
U.S. Cl. 568—885 6 Claims

1. Method of producing ethanol from acetic acid which comprises the steps:

(1) contacting acetic acid with an olefinically unsaturated hydrocarbon having about 4 to about 10 carbon atoms, in the presence of a catalytic amount of an acidic esterification catalyst whereby an ester is obtained;

(2) hydrogenating the ester from step (1) whereby a mixture of ethanol and a higher alcohol containing the same number of carbons as the olefinically unsaturated hydrocarbon from step (1) is obtained;

(3) separating the mixture of step (2) by fractional distillation into ethanol and the higher boiling alcohol;

(4) recovering the ethanol;

(5) dehydrating the higher boiling alcohol into the original olefinically unsaturated hydrocarbon used in step (1); and

(6) recycling the olefinically unsaturated hydrocarbon from step (5) with fresh acetic acid back to step (1) to repeat the process of esterification.

4,421,940

PREPARATION OF NITROALKANES

William V. Hayes, Clute, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Feb. 25, 1982, Ser. No. 352,506
Int. Cl.³ C07C 76/02
U.S. Cl. 568—948 10 Claims

1. In a process for making nitroalkanes by reacting an alkane with nitric acid in the vapor phase in the presence of an inert diluent gas, the improvement which comprises employing a catalyst of a salt or oxide of a metal of Group II in the periodic chart of the elements.

4,421,941

CATALYST AND PROCESS FOR SELECTIVE PRODUCTION OF PARA-DIALKYSUBSTITUTED BENZENES

David H. Olson, Pennington, and Paul G. Rodewald, Rocky Hill, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 223,878, Jan. 8, 1981, Pat. No. 4,379,761.
This application Sep. 10, 1982, Ser. No. 416,740
Int. Cl.³ C07C 2/68
U.S. Cl. 585—467 11 Claims

1. A process for the selective production of para dialkyl substituted benzenes wherein the alkyl group contains from 1 to 4 carbon atoms which comprises contacting, under conversion conditions, a hydrocarbon precursor selected from the group consisting of mono alkyl-substituted benzenes having 1–4 carbon atoms in the alkyl substituent and a mixture of said precursor or benzene with an alkylation agent containing from 1 to 4 carbon atoms with a catalyst composition comprising

a porous crystalline zeolite, having silica deposited thereon as a result of contact with a silicone compound of a molecular size incapable of entering the pores of the zeolite and subsequent heating in an oxygen-containing atmosphere to a temperature in excess of 300° C. but below a temperature at which crystallinity of the zeolite is adversely affected at a rate such that the silicone compound does not volatilize being characterized by an activity, in terms of alpha value, of between about 2 and about 5000, a xylene sorption capacity greater than 1 gram/100 grams of zeolite and an ortho xylene sorption time for 30 percent of said capacity greater than 10 minutes, said sorption capacity and sorption time being measured at 120° C. and a pressure of 4.5±0.8 mm. of mercury and modified by the addition thereto of phosphorus, and

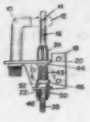
recovering from the resulting product mixture, a para-dialkyl-substituted benzene in an amount greater than the thermodynamic equilibrium concentration thereof in the total dialkyl substituted benzenes produced.

4,421,942

THERMOCOUPLE MOUNTING SYSTEM

John F. Crichton, Oakville, Canada, assignor to Robertshaw Controls Company, Richmond, Va.

Filed Dec. 7, 1981, Ser. No. 328,176
Int. Cl.³ H01L *35/28*
U.S. Cl. 136—217 **3 Claims**



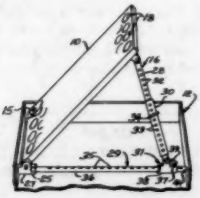
1. A thermocouple assembly for use with a burner in a mounting bracket with spaced openings for receiving the thermocouple, said assembly comprising an elongated thermocouple tube having a cylindrical outside surface which is mostly of uniform diameter but which includes a locating groove indented in and extending around the outside of the tube, said tube terminating in a closed tip at one end and an outwardly extending flange at the other end, and an elongated sheath having outer flanges for mounting it in a burner bracket, and having a cylindrical opening therethrough for receiving the thermocouple tube, the tube being long enough for its tip end to project out of one end of the sheath when the flange on the opposite end of the tube engages the sheath, said sheath having its said one end divided into integral fingers projecting parallel to the axis of said cylindrical opening and resiliently biased to press their tips toward the tube, the tips of said fingers having projections extending radially inward therefrom to enter into the locating groove, and the locating groove being positioned to receive the finger projections when the flange on the tube engages the sheath, whereby the tube is securely but removably held in a desired predetermined position.

4,421,943

COLLAPSIBLE MOBILE SOLAR ENERGY POWER SOURCE

Eric M. Withjack, Broken Arrow, Okla., assignor to Cities Service Company, Tulsa, Okla.

Filed Feb. 19, 1982, Ser. No. 350,507
Int. Cl.³ H01L *31/04;* **F24J** *3/02*
U.S. Cl. 136—246 **6 Claims**



1. An apparatus for providing electrical energy from a mobile solar energy power source having collapsible solar energy collecting means, comprising:

(a) at least one inner solar energy collecting means for collecting solar energy and converting the solar energy into electrical energy, said inner collecting means having an upper end and a lower end;

(b) a main base including a front and a back thereof, said main base pivotally mounted to the lower end of said inner collecting means such that said inner collecting means is free to pivot about the mounting axis between 0° and about 90° above the horizontal;

(c) at least one inner support member for each inner collecting means, said inner support member having a first end and a second end, the first end of said inner support member pivotally connected in proximity to the upper end of said inner collecting means, said inner support member comprising an inner leg and an outer leg including respective longitudinal axes thereof, the inner leg slidably mated within the outer leg such that the longitudinal axis of the inner leg is longitudinally aligned with the longitudinal axis of the outer leg, the length of said inner support member changeable by sliding the inner leg within the outer leg along their respective longitudinal axes;

(d) an inner guide member having a longitudinal axis, said inner guide member attached to said main base such that said inner guide member longitudinally traverses said main base between the front and the back thereof;

(e) an inner sliding shoe pivotally connected to the second end of said inner support member, said inner sliding shoe mounted to said inner guide member for movement along said inner guide member between the front and the back of said main base such that movement of said sliding shoe along said inner guide member in combination with the sliding of the inner leg within the outer leg allows positioning of said inner collecting means at an angle between about 0° and about 90° above the horizontal; and

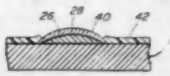
(f) means for storing the electrical energy received from the inner solar energy collecting means and supplying the energy to an external receptable.

4,421,944

PRINTED CIRCUITS

Raymond C. DesMarais, Jr., 1 Mansur St., North Chelmsford, Mass. 01863

Division of Ser. No. 103,157, Dec. 13, 1979, Pat. No. 4,327,124, which is a continuation of Ser. No. 928,876, Jul. 28, 1978, abandoned, which is a continuation of Ser. No. 707,355, Jul. 21, 1976, abandoned. This application Apr. 26, 1982, Ser. No. 372,094
Int. Cl.³ H05K *1/09*
U.S. Cl. 174—68.5 **2 Claims**



1. A printed circuit, comprising:

(a) a support stratum providing a dielectric surface;

(b) at least one circuit segment bonded to a selected area of said surface;

(c) said segment including a stratum of metal loaded resinous ink, a stratum of electrically conductive metal powder bonded to the surface of said ink and a stratum of electrically conductive solder alloyed to said stratum of metal powder;

(d) said stratum of metal loaded resinous ink including a phenolic based thermosetting resin of about 24% by weight, untreated copper powder of about 70% by weight, and a mixture of a catalyst of about 6% by weight comprised of anhydrous isopropanal and phosphoric acid;

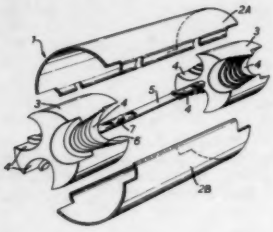
(e) said stratum of electrically conductive metal powder bonded to the surface of said ink and being formed of copper; and

(f) said stratum of electrically conductive solder alloyed to said stratum of metal powder being a composition of a lead-tin alloy with antimony of about 80% by weight, an inorganic acid flux of about 5% by weight, and a binder of about 15% by weight, said solder stratum materially enhancing the conductivity of said circuit segment.

4,421,945
JUNCTION ASSEMBLY

Marc F. Moinson, Strombeek-Bever, Belgium, assignor to N.V. Raychem S.A., Kessel, Belgium

Filed Feb. 16, 1978, Ser. No. 878,424
Claims priority, application United Kingdom, Apr. 21, 1977, 16699/77; Oct. 12, 1977, 42545/77
Int. Cl.³ H02G 15/113, 15/18
U.S. Cl. 174—92 24 Claims

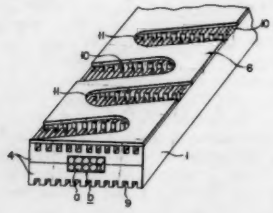


1. An assembly for protecting a junction between conduits, the assembly being openable to allow access to repair the junction and comprising (a) a tubular sleeve comprising a longitudinal split tube of internal diameter such that it can accommodate the junction, (b) support means for the split tube for positioning on each side of the junction, at least one support means being contoured to provide a plurality of laterally-enterable channels, each of at least some of the channels being capable in cooperation with the tubular sleeve of forming an outlet closed in cross-section for accommodating a conduit, (c) sealing means for independently sealing a conduit to a channel so that each conduit can be sealed into the assembly independently of any other conduit present therein, and (d) mechanical means for maintaining the outlet closed in cross-section.

4,421,946
HIGH CURRENT CAPACITY SUPERCONDUCTOR

Yoshio Furuto; Shinichiro Meguro, both of Shinagawa; Takuya Suzuki; Ikuo Ito, both of Nikko; Toshinari Ando, Ibaragi; Masataka Nishi, Ibaragi, and Susumu Shimamoto, Ibaragi, all of Japan, assignors to The Furukawa Electric Co., Ltd. and Japan Atomic Energy Research Institute, both of Tokyo, Japan

PCT No. PCT/JP80/00105, § 371 Date Jan. 8, 1981, § 102(e) Date Jan. 8, 1981, PCT Pub. No. WO80/02619, PCT Pub. Date Nov. 27, 1980
PCT Filed May 16, 1980, Ser. No. 230,952
Claims priority, application Japan, May 18, 1979, 54-61169
Int. Cl.³ H01B 12/00
U.S. Cl. 174—128 S 12 Claims

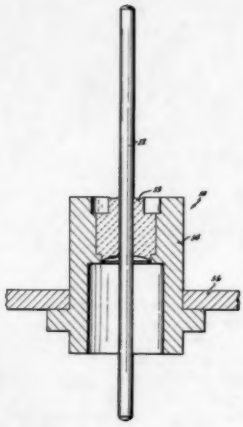


1. In a composite superconductor having superconductive wires and electrically and thermally high conductive stabilizing metal electrically coupled in the longitudinal direction of the superconductive wires, a high current capacity superconductor to be used in direct contact with a liquid coolant wherein the improvement comprises an inorganic compound film formed on the surface of the stabilizing metal.

4,421,947
POLYCRYSTALLINE INSULATING MATERIAL SEALS BETWEEN SPACED MEMBERS SUCH AS A TERMINAL PIN AND A FERRULE

James C. Kyle, 24372 Via San Clemente, Mission Viejo, Calif. 92675, assignor to James C. Kyle, Roseburg, Oreg.

Continuation of Ser. No. 840,740, Oct. 11, 1977, abandoned.
This application Jan. 28, 1981, Ser. No. 229,151
Int. Cl.³ H01B 17/26; C03C 27/02, 3/22
U.S. Cl. 174—152 GM 61 Claims



1. In combination,
a first member made from a noble metal,
a second member made from a material selected from the group consisting of titanium and an alloy of titanium and disposed in spaced relationship to the first member and having at least one of alpha (α) and beta (β) phases, and
an electrically insulating material preformed to provide partially amorphous and partially crystalline characteristics and hermetically sealing the first and second members and including at least one flux formed from the oxides of lead, silicon and boron, the insulating material being sealed to the first and second members, in at least one of the alpha (α) and beta (β) phases of the second member, by the application of heat to the first and second members and to the insulating material at a particular temperature for a limited period of time, the insulating material having partially amorphous and partially crystalline characteristics in the sealed relationship with the first and second members.

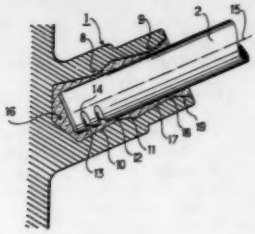
4,421,948
LINE POST TYPE ELECTRIC INSULATOR

Michel Willem, Abrest, France, assignor to Societe Anonyme dite: Ceraver, Paris, France

Filed Feb. 9, 1982, Ser. No. 347,200
Claims priority, application France, Feb. 13, 1981, 81 02890
Int. Cl.³ H01B 17/16
U.S. Cl. 174—158 R 4 Claims

1. An electric line post type insulator which comprises a rod made of glass fibres and resin covered with an insulating coating, one end of said rod being held fast in a fitting designed to be fixed on a post, wherein said fitting has a recess substantially in the shape of a double cone for receiving said end of the rod

and embedding it in an organic substance, said end having at least one groove to provide positive anchoring, said groove



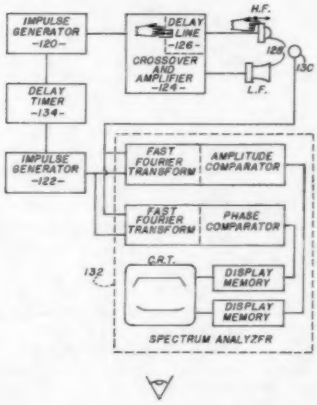
being formed only through the lower portion of the rod where the fibres are subjected to compression forces.

4,421,949

ELECTROACOUSTIC NETWORK

Steven J. Eberbach, 950 Fountain St., Ann Arbor, Mich. 48103

Filed May 5, 1980, Ser. No. 146,254
Int. Cl.³ H04R *1/22, 3/04, 3/14, 29/00*
U.S. Cl. 381—98 **15 Claims**



1. A co-axial pair of high and low frequency electroacoustic drivers wherein the high frequency driver is mounted in front of the low frequency driver, a cross-over filter network connected in the electrical signal path to both drivers, and a delay network connected in the electrical signal path to the high frequency driver,

the improvement comprising components of the filter and delay network being selected and adjusted for a substantially flat amplitude versus frequency response within the pass bands and through the cross-over frequency of the drivers and a substantially flat phase versus frequency response both within and beyond the pass bands of the low frequency filter driver network and the high frequency filter, delay and driver network, and,

means to substantially prevent direct sound radiation between the high frequency driver and the low frequeacy driver without inhibiting direct sound radiation from the low frequency driver to the environment comprising a sound absorbent material surrounding the side and back of the high frequency driver and an annular open space between the low frequency driver and the sound absorbent material.

2. The method of adjusting the elements of an electroacoustic network including a delay network comprising the steps of:

applying an electrical impulse signal to the signal path of the electroacoustic network and to a timer to trigger a delayed second identical impulse signal,

applying the second impulse signal to one channel of a spectrum analyzer,

sensing the acoustic output of the electroacoustic network and applying the sensed output signal electrically to another channel of the spectrum analyzer,

generating a frequency by frequency comparison of the amplitudes of the two signals input to the channels of the spectrum analyzer and a frequency by frequency comparison of the relative phase angles of the two signals input to the channels of the spectrum analyzer,

generating a Fourier analysis of the frequency by frequency comparisons of the signals in the spectrum analyzer,

displaying and viewing the acoustic phase and amplitude versus frequency response curves resulting from the analysis,

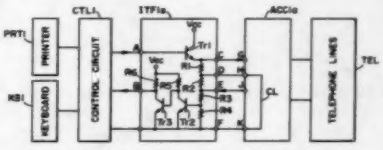
and in response thereto, adjusting the electroacoustic network to thereby flatten the acoustic phase and amplitude versus frequency response of the network.

4,421,950

COMMUNICATION DEVICE HAVING COUPLING MEANS

Sakae Horyu, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 5, 1980, Ser. No. 213,592
Claims priority, application Japan, Dec. 18, 1979, 54-163474
Int. Cl.³ H04M *11/00*
U.S. Cl. 179—2 DP **8 Claims**



1. A communication device comprising:

input means for introducing input information;

output means for recording or displaying the information to produce an output of the information;

control means connected to said input means and said output means for controlling the input and the output, respectively, of the information; and

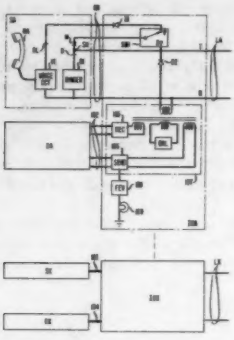
coupling means including a first input portion for introducing the information from said control means, a first output portion for providing the information from said first input portion to an external unit, a second input portion for introducing the information from the external unit, a second output portion for providing the information introduced from said second input portion to said control means, a connection portion connected to the external unit, and coupling elements for coupling said first output portion to said second input portion through said connection portion, said coupling means providing the information introduced from said first input portion to said second output portion through said coupling elements.

4,421,951

METHOD AND ARRANGEMENT FOR SIGNALING THE TRANSMISSION MODE OF A COMMUNICATION SYSTEM

John G. Van Bosse, Naperville, Ill., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sep. 24, 1981, Ser. No. 305,124
Int. Cl.³ H04M *11/00*
U.S. Cl. 179—2 DP 24 Claims



8. Apparatus for controlling the analog or digital communication mode of a transmission facility

characterized in that

said apparatus includes

means responsive to a control signal for providing either a first polarity dc signal over said facility to represent a first communication mode or a second polarity dc signal over said facility to represent a second communication mode and

control means for generating said control signal to interchange the existing coupling of said providing means in response to a predetermined interruption in the dc signal on said facility.

23. A method for controlling the analog or digital communication mode of a transmission facility characterized by the steps of

providing either a first polarity dc signal over said facility to represent a first communication mode or a second polarity dc signal over said facility to represent a second communication mode and

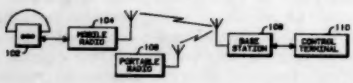
interchanging the dc signal coupled to said facility during the providing step in response to a predetermined interruption in the dc signal on said facility.

4,421,952

MULTI-FREQUENCY BUSY SIGNAL SYNTHESIZING CIRCUITRY

Michael F. Barnes, Hoffman Estates, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 16, 1981, Ser. No. 311,832
Int. Cl.³ H03B *19/00*
U.S. Cl. 179—2 EA 8 Claims



1. Circuitry for synthesizing a tone output signal that approximates a multi-frequency signal comprised of a first tone having a first predetermined frequency and a second tone having a second predetermined frequency, said synthesizing circuitry comprising:

a signal source for generating a clock signal having a predetermined frequency that is greater than said first predetermined frequency and said second predetermined frequency;

means for generating a control signal alternately having first and second states at a frequency that is substantially one-half of a frequency selected from a predetermined range of frequencies substantially midway between said first predetermined frequency and said second predetermined frequency; and

means coupled to the clock signal source and generating means for dividing the clock signal by a first number in response to the first state of the control signal to produce the tone output signal having a first frequency greater than said first predetermined frequency and by a second number in response to the second state of the control signal to produce the tone output signal having a second frequency that is greater than said second predetermined frequency.

4,421,953

TELEPHONE TACTILE ALERT SYSTEM

Lech S. Zielinski, Ottawa, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Dec. 7, 1981, Ser. No. 327,799
Int. Cl.³ H04M *11/00*
U.S. Cl. 179—2 EC 11 Claims

1. A system for non-audibly alerting a telephone user when the telephone is being energized by ringing volage, the system comprising (i) a telephone unit for coupling to the telephone line, the telephone unit including a sensing means for sensing successive ringing voltage bursts and a transmitter adapted to emit a signal burst in response to each successive ringing voltage burst, and (ii) a user unit including a receiver for receiving the signal bursts from the transmitter and a transducer under the control of the receiver for converting the received signal into a non-audibly sensible signal.

4,421,954

AUTOMATIC TELEPHONE ANSWERING AND MESSAGE RECORDING DEVICE

Satoshi Mita; Kouichi Tanaka, both of Kanagawa; Yoshitomo Nakano, Tokyo; Harumi Saita, Kanagawa, and Akira Nakayama, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 7, 1981, Ser. No. 261,512
Claims priority, application Japan, May 12, 1980, 55-62509
Int. Cl.³ H04M *1/64*
U.S. Cl. 179—6.13 8 Claims

1. A method of automatically answering phone calls on a phone line and recording messages from calling parties in sequence on a single magnetic tape with a magnetic tape device having a stop mode, a rewind mode, a forward mode, and a fast-forward mode comprising the steps of:

automatically coupling the device to the phone line upon detection of a ringing signal on the phone line;

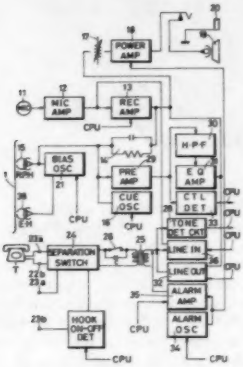
setting the device into its forward mode and playing a prerecorded outgoing message recorded in a track on the magnetic tape;

after the playing of the outgoing message and if no previous incoming messages have been recorded, recording in said track any incoming message from the calling party simultaneously with a control signal followed by a silent portion that is free of said control signal, said control signal being separable from said incoming message on playback;

storing a quantity representing the number of incoming messages that have been previously recorded in said track;

after the playing of the outgoing message and if incoming

messages have been previously recorded, setting said device into its fast-forward mode to drive said tape beyond the last such previously-recorded incoming message by detecting the presence of said recorded control signal and counting the number of spaces therein representing the silent portions between the recorded incoming messages, and then setting said device into its forward mode upon coincidence of the counted number of spaces and said stored quantity and recording the incoming message from the calling party simultaneously with said control



signal followed by said silent portion that is free of said control signal, said control signal being separable from said incoming message on playback;

upon termination of the incoming message, setting the device into its rewind mode; and

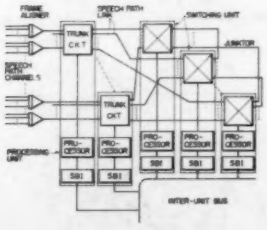
when said tape has been rewound to a point corresponding to the beginning of said recorded outgoing message, setting said device into its stop mode, thereby conditioning the device to greet any subsequent calling parties by playing back said recorded outgoing message.

4,421,955

DISTRIBUTED SWITCHING SYSTEM

Hiromichi Mori, Kawasaki; Jun Matsumoto, Tama, and Masanobu Fujioka, Tokyo, all of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 147,899, May 8, 1980, abandoned. This application Aug. 27, 1981, Ser. No. 296,616
Claims priority, application Japan, Jul. 20, 1979, 54-91637
Int. Cl.³ H04Q *3/42*
U.S. Cl. 179—18 EA **4 Claims**



1. A distributed switching system operating as a single large switching system as a whole comprising:

a plurality of switching units including speech-path switches and processors which control the said speech-path switches, and speech-path links inter-connecting said switching units for alternative routing between the units;

a plurality of processing units connected to speech paths for signal and call processing, each of said processing units including a trunk circuit connected with a group of said speech-paths for processing signals in accordance with signaling systems of the said speech-path group and also including a processor for controlling said trunk circuit, said processing units being operative to process signals and calls coming in from and going out to the said speech-paths; and

an inter-unit bus for transferring information between said switching units and said processing units,

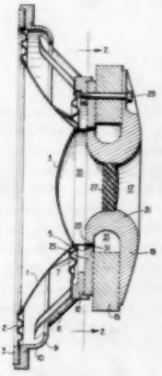
each said switching unit being operative as a small size simple function switching system which is highly independent of the other switching units, and each said processing unit being operative to process independently of the other processing units only incoming calls which come in to the processing unit to which the speech-paths carrying said incoming calls is connected or to process only outgoing calls which go out of the processing unit to which the speech-paths carrying said outgoing calls is connected.

4,421,956

LOUD SPEAKER WITH MINIMIZED MAGNETIC LEAKAGE

Robert M. O'Neill, Meridian, Miss., assignor to Peavey Electronics Corp., Meridian, Miss.

Filed Sep. 29, 1981, Ser. No. 306,926
Int. Cl.³ H04R *9/00, 9/06*
U.S. Cl. 179—120 **4 Claims**



1. In a loudspeaker, which includes a diaphragm, a voice coil attached to the diaphragm, a basket for supporting the diaphragm, an annular permanent magnet, an annular front plate between the magnet and the basket, a back plate on the side of the magnet opposite the front plate, and a pole-piece extending through the annular magnet and forming a magnetic gap with the front plate, the improvement wherein:

said back plate and pole piece are integral, said back plate being annular and having a thickness which smoothly tapers radially from a first inner thickness to a smaller circumferential thickness, said pole piece having a toroidal portion with a first surface convex to a central opening and a second surface concave to the exterior of said pole piece, an upper surface of said back plate merging smoothly with said second surface and a lower surface of said back plate merging smoothly with said first surface, said pole piece including a flat annular portion merging smoothly with the toroidal portion and extending parallel to said upper surface and terminating in a cylindrical surface forming one side of said gap,

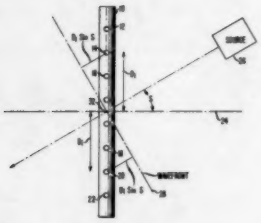
whereby the magnetic field of said magnet is concentrated into said gap and leakage of the magnetic field is minimized.

4,421,957

END-FIRE MICROPHONE AND LOUDSPEAKER STRUCTURES

Robert L. Wallace, Jr., Warren, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jun. 15, 1981, Ser. No. 273,734
Int. Cl.³ H01R 1/10
U.S. Cl. 179—121 D **9 Claims**



1. Acoustic end-fire apparatus for producing a directional response comprising a sound transducer; and

a plurality of acoustical paths coupling the sound transducer to the atmosphere, each path having a transducer end and an atmosphere end; and a centerline corresponding to a line equidistant from the atmosphere end of the shortest path and the atmosphere end of the longest path;

the acoustical paths being arranged in an array of pairs, the atmosphere ends of the ith pair being equal distances D_i on opposite sides of said centerline; the distance between any path atmospheric end and the centerline being given by the application of the recursive formulae:

$$D'_i = D_i - \Delta D_i$$

$$\Delta D_i = \frac{KR}{4\pi\,(\mathrm{Sin}\theta - 1)} \sin[4\pi\, D_i\,(\sin\theta - 1)]$$

where R is the response of the apparatus given by the formula

$$R = \frac{2\sum_{i=1}^{N} \mathrm{Cos}[4\pi\, D_i\,(\mathrm{Sin}\theta - 1)]}{2N}$$

K=ΔR/R, the desired fractional change in response,

ΔR=desired change in response,

2N=number of paths,

D_i=initial distance of the ith path atmospheric end from the centerline of the array,

D'_i=final distance of the ith path atmospheric end from the centerline array,

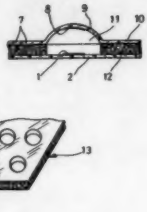
θ=angle of incidence which a sound wavefront makes with the centerline.

4,421,958

PANEL KEYBOARD WITH AIR PERMEABLE SPACER

Eiichi Kameda, Kukizaki, Japan, assignor to Nippon Mektron Co., Ltd., Japan

Filed Jun. 5, 1981, Ser. No. 271,041
Claims priority, application Japan, Jun. 10, 1980, 55-078674
Int. Cl.³ H01H 13/70
U.S. Cl. 200—5 A **10 Claims**



1. A membrane switch assembly comprising:

first circuit means, said first circuit means comprising a flexible planar nonconductive substrate having a conductive circuit pattern supported on at least a first surface thereof;

second circuit means, said second circuit means including a nonconductive substrate having a conductive circuit pattern supported on at least a first surface thereof, said circuit pattern of said second circuit means facing said circuit pattern of said first circuit means and being at least partly in registration therewith; and

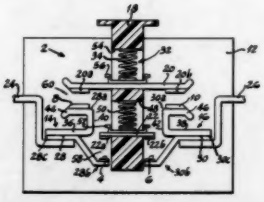
nonconductive spacer means, said spacer means being disposed between said first and said second circuit means, said spacer means including at least a first aperture extending therethrough, said aperture being aligned with registered circuit portions on said circuit means whereby electrical contact between registered portions of said circuit pattern of said first circuit means and said circuit pattern of said second circuit means may be established through said spacer means aperture, said aperture cooperating with said circuit means to define a cavity between said first and said second circuit means, said spacer means comprising a sheet of resilient gas permeable material through which gas may flow into or out of said cavity from or to adjacent peripheral regions of the membrane switch assembly.

4,421,959

BRIDGING CONTACTOR WITH MAIN AND ARCING CONTACTS

C. Gregory Chen, Brown Deer, and Daniel A. Wycklendt, Milwaukee, both of Wis., assignors to Eaton Corporation, Cleveland, Ohio

Filed Apr. 19, 1982, Ser. No. 369,762
Int. Cl.³ H01H 9/38, 15/00
U.S. Cl. 200—16 A **6 Claims**



1. A bridging contact structure with double-break main contacts and double-break arcing contacts, comprising:

a housing;

contact support means in said housing and having a pair of spaced stationary main contacts in parallel with a pair of spaced stationary arcing contacts;

actuator means movable in said housing and carrying a main conductor and an arcing contactor, said actuator means being movable to an ON position with said arcing contactor engaging said arcing contacts followed by said main contactor engaging said main contacts, said actuator means being movable to an OFF position with said main contactor disengaging said main contacts followed by said arcing contactor disengaging said arcing contacts; said actuator means includes lost motion means operative with said arcing contactor upon engagement of said arcing contacts to maintain such engagement during continued movement of said actuator means to said ON position, and further maintaining such engagement during return movement of said actuator means towards said OFF position until said main contactor disengages said main contacts;

said contact support means comprises a pair of spaced opposed terminals extending laterally towards each other, each terminal having an upper and lower branch facing the upper and lower branch of the other terminal, the facing upper branches mounting a respective pair of said contacts, and the facing lower branches mounting the other pair of said contacts;

said actuator means comprises a plunger slideable up and down between said facing terminal branches, said contactors extending laterally across said plunger for butting engagement with respective said contacts;

said lost motion means comprises resilient biasing means bearing between said plunger and said arcing contactor and biased to a given loaded condition upon movement of said plunger to said ON condition.

4,421,960

STEERING WHEEL WITH SWITCH ASSEMBLY

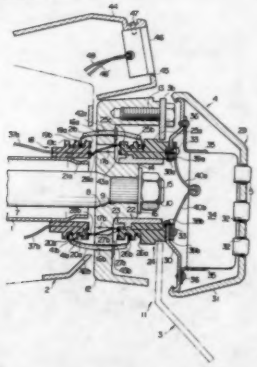
Sumitsugu Arima, Yokosuka; Hiroshi Tsuda, and Yukio Fukunaga, both of Yokohama, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Jul. 29, 1981, Ser. No. 287,944

Claims priority, application Japan, Sep. 5, 1980, 55-126288[U]

Int. Cl.³ H01H *9/00*; H01R *39/00*

U.S. Cl. 200—61.54 **13 Claims**



1. A steering mechanism for a steerable vehicle including a body structure having a fore-and-aft direction, comprising:

a hollow steering column tube held stationary with respect to said body structure,

a steering shaft axially extending in and through said steering column tube, the steering shaft having a center axis therethrough and being rotatable about the center axis with respect to the column tube,

a steering wheel rotatable with the steering shaft about said center axis and having a circular rim portion,

a switch support structure positioned internally of the rim portion of said steering wheel,

a switch assembly mounted within said switch support structure and including an electric switch unit to be manually actuated,

a column-tube covering member held stationary with respect to said body structure and having at least a rear end portion of said steering column tube enclosed therein,

retaining means for retaining said switch support structure in position independently of the turning movement of said steering wheel and holding the switch support structure against rotation with respect to said steering column tube and said column-tube covering member, and

an optical display unit supported by said column tube covering member and positioned in front of said steering wheel,

said steering shaft having a rear end portion axially projecting rearwardly from said steering column tube and said steering wheel forming part of a steering wheel structure which further comprises a hub member secured to the rear end portion of the steering shaft, said switch support structure being rotatable about an extension of the center axis of the steering shaft with respect to said hub member,

wherein said retaining means comprises a first spool member fixed with respect to said steering column tube and formed with at least two circumferential grooves about the center axis of said steering shaft, a second spool member having said switch support structure secured thereto and formed with at least two circumferential grooves about the center axis of the steering shaft, said second spool member being rotatable on said hub member about the center axis of the steering shaft, and at least two flexible lines each anchored at one end thereof to said first spool member and at the other end thereof to said second spool member, one of the flexible lines being wound in one direction about the center axis of the steering shaft partially in one of the two circumferential grooves in said first spool member and partially in one of the two circumferential grooves in said second spool member, the other of the flexible lines being wound in the other direction about the center axis of the steering shaft partially in the other of the two circumferential grooves in said first spool member and partially in the other of the two circumferential grooves in said second spool member.

4,421,961

VACUUM CIRCUIT BREAKER

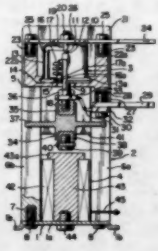
Shinzo Sakuma, Yokohama; Hifumi Yanagisawa, Sagamihara; Kazuo Tokuhata, Kanagawa, and Hiroshi Miyagawa, Yokohama, all of Japan, assignors to Kabushiki Kaisha Meidensha, Tokyo, Japan

Filed Feb. 13, 1981, Ser. No. 235,023

Claims priority, application Japan, Feb. 14, 1980, 55-17148

Int. Cl.³ H01H *33/66*

U.S. Cl. 200—144 B **8 Claims**



1. A vacuum circuit breaker having at least one vacuum power interrupter unit comprising:

(a) a bell-shaped metallic casing having a radially extending portion provided in the vicinity of an open end thereof;
(b) an insulating circular end plate made of a ceramic material fitted to the opening end of said bell-shaped metallic casing so as to form a vacuum vessel together with said bell-shaped metallic casing;
(c) a stationary electrical contact rod extending into said bell-shaped metallic casing and having a stationary electrical contact provided at the extending end thereof;
(d) a movable electrical contact rod extending into said bell-shaped metallic casing so as to move relative to said stationary electrical contact rod and having a movable electrical contact at the extending end thereof; and
(e) an actuating mechanism disposed below said movable electrical contact rod for opening said movable electrical contact with respect to said stationary electrical contact, the improvement wherein a peripheral surface of said insulating circular end plate outside said vacuum vessel and a radially extending surface portion of said bell-shaped metallic casing are embedded into an insulating molded block made of a resin, the remaining surface portion of said bell-shaped metallic casing being exposed to air.

4,421,962

COMPRESSED GAS CIRCUIT-BREAKER

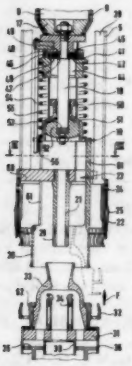
Edmond Thuries, Pusignan; Pierre-Paul Sigward, Villeurbanne; Marcel Besson, Eyzin-Pinet; Doan P. Van, Meyzieu, and Dante Nicoloso, Jonage, all of France, assignors to Alsthom-Atlantique, Paris, France

Filed Jul. 23, 1981, Ser. No. 286,220

Claims priority, application France, Jul. 23, 1980, 80 16222; Mar. 31, 1981, 81 06444

Int. Cl.³ H01H *33/16*

U.S. Cl. 200—144 AP **11 Claims**



1. A compressed gas circuit-breaker comprising:
a resistance,
a tubular stationary contact,
a tubular moving contact,
an insertion device for inserting said resistance in a circuit including said circuit-breaker when the circuit-breaker closes, the insertion device and the resistance being disposed in a coaxial casing,
means responsive to movement of said moving contact for controlling the device,
said insertion device being of the semi-mobile type and having a first means for damping its movement during circuit-breaker closing and a second means for delaying its movement when the circuit-breaker opens,
and wherein the first means and the second means comprise gas pressure damping means which operate by gas pressure reduction.

4,421,963

MAGNETIC EXTINCTION OF ARCS IN SWITCHES

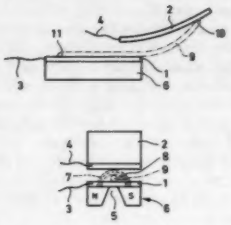
Martin Mailander, Leinfelden, Fed. Rep. of Germany, assignor to Deutsche Forschungs- und Vesuchsanstalt für Luft und Raumfahrt e.V., Fed. Rep. of Germany

Filed Jun. 22, 1981, Ser. No. 276,174

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1980, 3023673

Int. Cl.³ H01H *9/44, 33/18*

U.S. Cl. 200—147 R **16 Claims**



1. A method of extinguishing the arc formed between an anodic spot and a cathodic spot on the respective contacts of a circuit-breaking switch, comprising causing the cathodic spot to be displaced along the surface of said contact with said cathodic spot under the influence of a magnetic field in a direction contrary to the direction of the Lorentz force so that the arc is lengthened until it is extinguished.

7. A switch for circuit-breaking, comprising two contacts which constitute an anode and a cathode during circuit-breaking when an arc is formed between an anodic spot and a cathodic spot on the respective contacts, and means for generating a magnetic field in the region of the cathode such that the cathodic spot is displaced under the influence of said magnetic field along the surface of said cathodic contact contrary to the direction of the Lorentz force, whereby the arc is lengthened until it is extinguished.

4,421,964

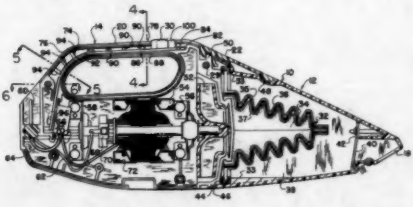
REMOTE SWITCH ACTUATION

Dean H. Buchtel, Canton, Ohio, assignor to The Hoover Company, North Canton, Ohio

Filed Apr. 2, 1982, Ser. No. 364,780

Int. Cl.³ H01H *9/06*

U.S. Cl. 200—157 **6 Claims**



1. A hand held appliance including;
(a) a handle having a straight section and a relatively steeply curved section,
(b) a switch actuating button disposed adjacent to said handle,
(c) a guideway formed by said handle and extending longitudinally therealong,
(d) a switch for said hand held appliance disposed adjacent said guideway and remote from said switch actuating button,

(e) a flexible lamella-like link, extending in said guideway, attached to said switch and said switch actuating button adjacent its terminations,

(f) whereby said flexible link moves, upon movement of said switch actuating button, to actuate said switch.

4,421,965

COMMUTATOR WITH SEVERAL LAYERS OF CROSS-POINTS

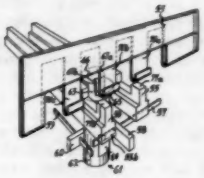
Alain Gentric, 27 Lotissement Keranroux, Ploubezre 22300 Lannion, and Andre Frances, 3, allee des Ajoncs, 22300 Lannion, both of France

Continuation of Ser. No. 174,790, Aug. 4, 1980, abandoned. This application May 17, 1982, Ser. No. 379,058

Claims priority, application France, Aug. 16, 1979, 79 21202

Int. Cl.³ H01H *63/00*

U.S. Cl. 200—175 **18 Claims**



1. A switch with several layers of cross points, composed of several first layers of spaced parallel conductors oriented in a first direction and of several second layers of spaced parallel conductors oriented in a direction perpendicular to the first direction, the first and the second layers being interposed between each other, each layer of conductors being carried by a grid of insulating material, said grid of insulating material defining an orthogonal array of windows having perpendicular conductors exposed therein, plug means in at least some of said windows, a cross point comprising at least two superimposed adjacent layers and a conductor surface formed on an associated one of said plugs, the height of the conductor surface on said plug being sufficient to electrically connect a conductor segment of an upper conductor with a conductor segment of a lower conductor, each of said plug conductor surfaces occupying an angular sector in the order of 180°, and means for causing said plugs to rotate by one quarter of a rotation in one direction or in the other direction in order to open or close the cross point.

4,421,966

KEYBOARD ELASTOMERIC COVER WITH BUTTONS HAVING CHANGEABLE LEGENDS

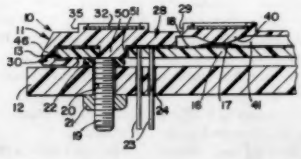
Walter R. Pounds, Lafayette, Colo., assignor to KB Denver, Inc., Frederick, Colo.

Filed Jul. 26, 1982, Ser. No. 401,657

The portion of the term of this patent subsequent to Oct. 5, 1999, has been disclaimed.

Int. Cl.³ H01H *9/04*

U.S. Cl. 200—309 **12 Claims**



1. In a keyboard assembly having a printed circuit board with conductive paths and dome switches coacting with said paths, and a cover member for said board, wherein said board includes fastening means for mounting the assembly on a support panel, the improvement being in the cover member which comprises an elastomeric boot overlying the board and sealing said board to said support panel against the entry of contaminants, said boot having coacting button and dome actuating portions aligned with said dome switches, sealing means disposed peripherally of the board and between the board and panel, and alignemnt bosses matingly received in sockets formed in the board to maintain the dome actuating portions in alignment with said dome switches.

4,421,967

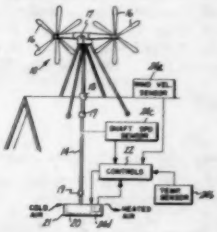
WINDMILL DRIVEN EDDY CURRENT HEATER

Warren J. Birgel, Golden Valley, and Chester S. Hajec, Roseville, both of Minn., assignors to VS Systems, Inc., St. Paul, Minn.

Continuation of Ser. No. 170,736, Jul. 21, 1980, abandoned. This application Jan. 25, 1982, Ser. No. 342,602

Int. Cl.³ H05B *6/06*; F03D *9/00*

U.S. Cl. 219—10.51 **4 Claims**



1. An apparatus for converting wind energy to heat, comprising:

windmill means for rotating a shaft in response to wind movement;

eddy current heater means having an inner stator fixedly mounted and an electrically conductive metal outer rotor which at least partially surrounds the inner stator and has an inner surface which is spaced from an outer circumference of the stator by a narrow air gap which is connected to and driven by the shaft and which is rotatably mounted in relation to the inner stator, a plurality of north and south ferromagnetic pole pieces alternately spaced and supported about the circumference of the stator, and magnetic field coil means mounted on the inner stator between the pole pieces for generating, as a function of a variable electrical excitation current, magnetic flux lines which pass from the north pole pieces across the air gap through the outer member and across the air gap to adjacent south pole pieces to induce eddy currents in the outer rotor which create a torque opposing rotation of the outer rotor and which thereby generate heat in the outer rotor as the outer rotor rotates relative to the inner stator due to rotation of the shaft, the heat generated in the outer rotor being a function of the torque opposing rotation and relative speed of the outer rotor with respect to the inner stator, and wherein the torque opposing rotation is a function of magnetic coupling between the outer rotor and the inner stator across the air gap produced by the magnetic flux lines;

first sensing means for sensing wind velocity and providing a first electrical signal indicative thereof;

second sensing means for sensing ambient room temperaure of an area heated by heat derived from the outer rotor and providing a second electrical signal which is a function of the sensed ambient room temperature;

control means for providing the variable electrical excitation

current to the magnetic field coil means to control the magnetic coupling between the outer rotor and the inner stator as a function of (a) the first electrical signal, (b) the second electrical signal and (c) a predetermined torque speed curve as a function of wind velocity for the windmill means so that the eddy current heater means generates a desired heat output; and

means for drawing air past an outer surface of the outer rotor to derive heat from the eddy current heater means.

4,421,968

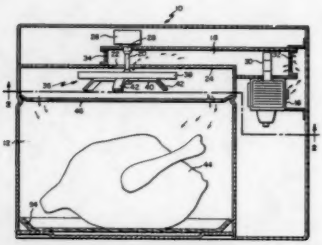
MICROWAVE OVEN HAVING ROTATING CONDUCTIVE RADIATORS

John M. Osepchuk, Concord, Mass., assignor to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 965,636, Dec. 1, 1978, abandoned. This application Jan. 5, 1981, Ser. No. 222,811

Int. Cl.³ H05B *6/72*

U.S. Cl. 219—10.55 F **3 Claims**



1. A microwave oven comprising:

a conductive enclosure;

a waveguide positioned outside said enclosure adjacent to a horizontal wall of said enclosure;

a magnetron for energizing said waveguide with microwave energy;

an aperture in said wall communicating from said waveguide into said enclosure;

an antenna probe extending vertically through said aperture for coupling said microwave energy from said waveguide into said enclosure;

a plurality of microwave radiating elements positioned in said enclosure;

transmission lines for coupling said microwave energy from said antenna probe to said microwave radiating elements, said transmission lines comprising conductive strips connected to said antenna probe at a common junction, each of said conductive strips extending radially from said antenna probe and supporting one of said radiating elements, each of said conductive strips being parallel to said wall and spaced less than a quarter wavelength of said microwave energy from said wall wherein said wall functions as a ground plane substantially limiting microwave radiation from said conductive strips; and

means for rotating said antenna probe about its axis wherein said conductive strips move with respect to adjacent portions of said wall to move said radiating elements in circular paths around said antenna probe.

4,421,969

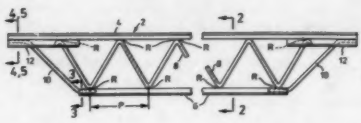
METHOD FOR FABRICATING OPEN WEB STEEL JOISTS

Joseph M. Tanenbaum, 4 Dewbourne Ave., Toronto, Ontario, Canada (M5P 1Z2)

Division of Ser. No. 179,634, Aug. 20, 1980. This application Jul. 21, 1981, Ser. No. 285,498

Int. Cl.³ B23K *11/32*

U.S. Cl. 219—107 **3 Claims**



1. In a method for fabricating open web steel joists having at least two substantially uniformly spaced apart chord members joined together by generally planar web member, with said chord member having a smaller cross sectional area than said web member at the common regions of contact, including the steps of:

(a) forming said chord members by drawing chord forming material through a chord forming station for straightening, shaping and cutting said chord forming material;

(b) forming said web member by uniformly bending equal sections of web forming material into an undulating configuration of generally uniform pattern having a series of apices presented by said bent web forming material;

(c) then feeding said formed chord and web members to a surface cleaning station to provide said members with surfaces substantially free of scale and coating;

(d) then moving said cleaned members to a stacking station and stacking said chord members along one side of a welding path extending longitudinally to said chord members and stacking said web members along the other side of said path;

(e) then moving said chord and web members from said stacking station onto said path and there assembling said chord members in substantially parallel relation with said web member between said chord members so that alternate opposite apices presented by said web member contact said spaced chord members respectively;

(f) then feeding said assembled members along said path to a resistance welding station;

(g) then simultaneously clamping at least four of said juxtaposed apices of said web member to each of said chord members respectively between first and second electrodes so as to exert an external force at said common regions of contact for urging said members together, with the first electrode means in clamped contact with said chord member of lesser cross sectional area in said region of contact and the second electrode means in clamped contact with said web member of larger cross sectional area at said region of contact respectively;

(h) then applying to said regions of contact through said first and second electrodes a series of time controlled intermittent impulses of electric current adapted to incrementally raise the temperature of said chord and web members in said region of contact to substantially the same level and in stages so as to minimize the escape of generated heat energy from said region of contact and effectively weld said members along said region of contact and substantially reduce formation of weld defects in said region of contact;

(i) then unclamping said members so as to remove said external force from said region of contact;

(j) then feeding said members along said path a further predetermined distance in a direction towards said welding station so as to present said next four following apices for welding to said chord members;

(k) then repeating said clamping step, said application step,

said unclamping step, and said feeding step successively so as to progressively simultaneously weld each of said next following four juxtaposed apices presented by said chord and web members respectively;

(l) and finally removing said welded members from said path.

4,421,970

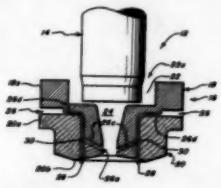
COOLING AND HEIGHT SENSING SYSTEM FOR A PLASMA ARC CUTTING TOOL

Richard W. Couch, Jr., Hanover, N.H., assignor to Hypertherm, Incorporated, Hanover, N.H.

Division of Ser. No. 230,025, Jan. 30, 1981, Pat. No. 4,361,748. This application Apr. 5, 1982, Ser. No. 365,466

Int. Cl.³ B23K 9/00

U.S. Cl. 219—121 PV **1 Claim**



1. In the method of initially positioning a plasma arc cutting torch relative to a workpiece, the torch being of the type in which a swirling motion is imparted to an ionizable gas through which the arc takes place, the flow of ionizable gas being initiated while the torch is in a retracted position and said swirling motion producing a vortex in said gas flow, the torch being advanced toward the workpiece, the advance being terminated in response to a sensed, abrupt change in the pressure of said vortex within the torch, and the torch having an internal passage system in its nozzle that conducts a cooling liquid through said nozzle, the improvement comprising

providing a set of auxiliary ports each in fluid communication with said cooling passage system, said auxiliary ports diverting a portion of said cooling liquid and said gas from said nozzle,

stopping the flow of said cooling liquid through said nozzle, and

directing a stream of gas through said auxiliary ports while said torch is retracted from the workpiece at a sufficient flow rate and pressure to drive residual cooling liquid from said nozzle prior to cutting.

4,421,971

ARC WELDING PROCESS

Jun Ukai; Toyozo Tetsu, and Kunio Shamoto, all of Aichi, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

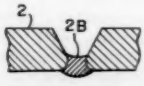
PCT No. PCT/JP80/00037, § 371 Date Sep. 16, 1980, § 102(e) Date Sep. 16, 1980, PCT Pub. No. WO80/01771, PCT Pub. Date Sep. 4, 1980

PCT Filed Feb. 29, 1980, Ser. No. 197,102

Claims priority, application Japan, Mar. 1, 1979, 54-23861

Int. Cl.³ B23K 9/00

U.S. Cl. 219—128 **7 Claims**



1. An arc welding process for welding along a weld line by arcing between an electrode of a welding torch and a workpiece having an outer and inner side comprising:

placing a pair of gas nozzles on opposite sides of said electrode along a line perpendicular to said weld line adjacent said outer side;

ejecting a functional gas from said nozzles toward said workpiece and toward said arc;

compressing said arc between said nozzles with said functional gas such that said arc is flattened along said weld line; and

forming a convex penetration weld bead on an inner side of said workpiece irrespective of the orientation of said arc with respect to said workpiece by directing said functional gas against said bead.

4,421,972

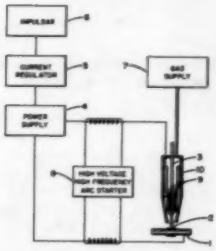
PULSED DIRECT CURRENT ARC WELDING

John R. Duncan, Tarzana; Roderick G. Rohrberg, Torrance; Ross A. Moyer, Lafayette, and William E. Wright, Sr., E. Syracuse, all of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Apr. 9, 1981, Ser. No. 252,567

Int. Cl.³ B23K 9/09

U.S. Cl. 219—137 PS **6 Claims**



1. A method of arc welding of work pieces having surface oxides which comprises:

positioning an electrode and the work pieces relative to each other to form an arc gap;

providing inert gas continuously at the arc gap;

applying across the arc gap an arc starter voltage having a magnitude sufficient to ionize the inert gas and initiate current flow across the arc gap;

discontinuing the arc starter voltage;

providing a maintenance current flow across the arc gap which is sufficient to sustain a minimum current flow across the arc gap throughout the arc welding process, said maintenance current providing a power flow which is insufficient to increase the temperature of the work pieces to the melting temperature of the work pieces;

increasing the magnitude of the current flowing across the arc gap to a peak value which can provide sufficient power flow to melt the work pieces and which is of sufficient magnitude that a power flow is provided which dissipates oxides on the surfaces of the work pieces during the time interval in which the increase in current flow occurs;

holding the current flow across the arc gap at substantially the increased value for a duration of time sufficient to provide enough energy to heat the work pieces to their melting temperature;

decreasing the magnitude of the current flowing across the arc gap to substantially the maintenance current value to allow the temperature of the work pieces to decrease to a temperature below their melting temperature whereby the work pieces are welded together;

cycling the current flow across the arc gap by repeating the steps of increasing, holding, and decreasing the current flow to vary the magnitude of the current flowing across the arc gap between the maintenance current value and the peak current value to form a series of current pulses which are applied to the work pieces; and

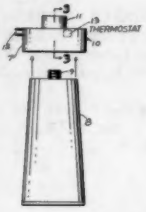
changing the relative position of the electrode and the work pieces to direct each current pulse to a selected portion of the work pieces.

4,421,973

ELECTRIC TOOTH PASTE TUBE WARMER

Kwong-Li Lou, 2400 W. Alhambra Rd., Alhambra, Calif. 91801

Filed May 18, 1981, Ser. No. 264,675
Int. Cl.³ B67D *5/62*; B05B *1/24*; H05B *3/00*
U.S. Cl. 219—301 **4 Claims**



1. An apparatus for prewarming the tooth paste in a tooth paste tube before it is extruded from the tube through an opening in the end of the tube, said apparatus comprising:

a cap-shaped member closing said opening and enveloping the outlet end of said tooth tube, the cap-shaped member having an outer skirt portion extending along and surrounding a portion of the tubular side wall of the tube;

an electrical heating element insulated and molded in said cap-shaped member including said outer skirt portion surrounding the side wall of the tube with exterior electrical terminals to the heating element extending on the outside; and

connecting means on said cap-shaped member for detachably holding the cap-shaped member on and enclosing the outlet end of said tooth paste tube,

whereby the tooth paste in the outlet section of said tooth paste tube is warmed up when the exterior electrical terminals of said electrical heating element are connected to an electrical power source while the tube is closed by the cap-shaped member.

4,421,974

ELECTRIC RICE COOKER

Hiroyuki Oota, Iwakura; Terutaka Aoshima, Toyohashi; Kenji Yamamori, and Ryuho Narita, both of Nagoya, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Jan. 18, 1983, Ser. No. 458,873
Claims priority, application Japan, Jan. 29, 1982, 57-14111
Int. Cl.³ F27D *11/02*
U.S. Cl. 219—441 **9 Claims**

1. An electric rice cooking apparatus comprising:

(a) a cooking kettle for containing rice and a proper amount of water therefor;

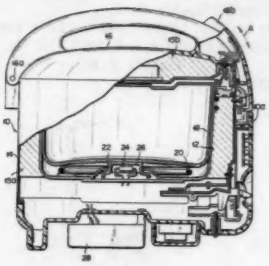
(b) thermal insulating frame means for detachably placing said cooking kettle therein;

(c) heater means disposed in said frame means, for electrically heating the kettle contents to perform main cooking and subsequent auxiliary cooking for effectively converting beta-starch to alpha-starch;

(d) temperature detecting means disposed in said frame means, for measuring the actual temperature of said cooking kettle and for producing a detection signal corresponding to the actual kettle temperature;

(e) first control means, connected to said temperature detecting means and said heater means, for deenergizing said heater means to complete the main cooking at a proper time in accordance with the actual kettle temperature indicated by the detection signal, and for energizing said heater means again to initiate the auxiliary cooking at another proper time;

(f) auxiliary cooking operating time determinating means connected to said temperature detecting means, for electrically detecting a change in the actual kettle temperature represented by the detection signal after the main cooking is completed in every cooking operation, for determining the actual amount to be cooked in accordance with a change in the actual kettle temperature, and for producing a data signal indicating a reference timer operating interval corresponding to the auxiliary cooking operating time in accordance with the amount to be cooked; and



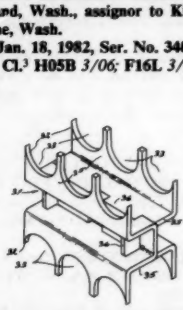
(g) second control means, connected to said auxiliary cooking operating time determining means and said heater means, for receiving the data signal to measure the actual time interval of the auxiliary cooking operation, and for finally deenergizing said heater means when said actual time interval is equal to the reference timer operating interval, thereby completing the auxiliary cooking operation.

4,421,975

HEATING ELEMENT ASSEMBLY

John Stein, Fruitland, Wash., assignor to Kim Hotstart Mfg. Co., Inc., Spokane, Wash.

Filed Jan. 18, 1982, Ser. No. 340,182
Int. Cl.³ H05B *3/06*; F16L *3/22*
U.S. Cl. 249—335 **10 Claims**



1. A brace for interlocking a group of elongated heating elements each having two legs arranged substantially parallel to one another and joined by a U-shaped bend at one end of the element, said legs being fixed to a supporting wall at the remaining end of the element, the brace comprising:

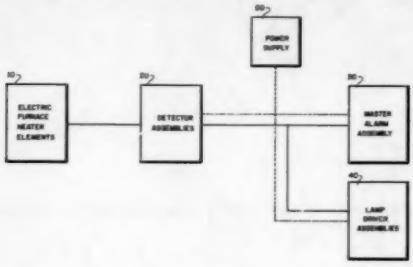
a partition having oppositely facing outer edges each having a plurality of recesses formed across them complementary to the spacing of the element legs for loosely engaging an equal number of element legs along each of its outer edges while perpendicular to the heating element legs, said partition being free to move parallel to the element legs in response to their vibration to an average vibrational node for the plurality of elements.

4,421,976

SYSTEM FOR MONITORING HEATER ELEMENTS OF ELECTRIC FURNACES

John J. Jurek, Watertown, Wis., assignor to General Signal Corporation, Stamford, Conn.

Filed Aug. 26, 1981, Ser. No. 296,666
Int. Cl.³ H05B 1/02
U.S. Cl. 219—506 3 Claims



1. A system for monitoring heater elements of electric furnaces and the like to identify individual failures, comprising:

a plurality of individual detector circuits, including first means for simultaneously detecting the electrical open state of each of a respective plurality of heater elements, and second means for simultaneously measuring the voltage of each of said heater elements;

said means for simultaneously detecting the open state including a current transformer continuously connected to a respective heater element;

said means for simultaneously monitoring the voltage of each of said heater elements including a voltage detecting pair of terminals continuously connected directly across each heater element;

said first and second means further comprising an opto-coupler integrated circuit device in each of said individual detector circuits;

a first comparison means in each of said detector circuits for comparing, with reference voltage, the resultant signal derived from said current transformer for each heater element and from said voltage detecting pair of terminals for monitoring the voltage of each heater element;

a second comparison means, and a timing means connected between said first and second comparison means to insure that a failure condition must exist for a minimum time for a failure to be indicated;

means for simulltaneously providing a master alarm indication of a defined failure in any one or more of said heater elements;

means for simultaneously providing an individual alarm indication for all of said plurality of heater elements so as to identify particular failed elements, said means including a light-emitting diode in an individual indicator circuit for each of said heater elements.

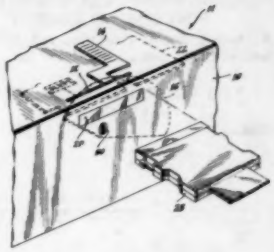
4,421,977

SECURITY SYSTEM FOR ELECTRONIC DEVICE

Lloyd G. Kittredge, Trumbull, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Jul. 19, 1982, Ser. No. 399,595
Int. Cl.³ G07G 1/00
U.S. Cl. 235—101 10 Claims

1. An electronic calculating device comprising a memory means having accounting information registered thereon, a control means for calculating the accounting information and entering the information into the memory means, a power supply providing power to the control means, a switch means having a first position in which an electrical connection is provided between the power supply and the control means and a second position in which the power supply is disconnected from the control means, the switch being in the first position during normal operation of the calculating device, a secured housing enclosing the memory means, the control means, and the switch means and preventing access thereto during normal operation of the calculating device, and an aperture in the



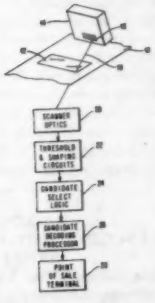
housing permitting access to the memory means to read out accounting information registered thereon, wherein movement of the switch from the first position to the second position to disconnect the control circuit from the power supply disables the calculating device from further normal operation but permits readout of the accounting information through the aperture.

4,421,978

DECODING METHOD FOR MULTICHARACTER LABELS

George J. Laurer, Raleigh, and Olen L. Stokes, Jr., Cary, both of N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 20, 1981, Ser. No. 294,594
Int. Cl.³ G06K 7/10
U.S. Cl. 235—462 14 Claims



1. A method of decoding a multicharacter label having one or more ambiguous positions, each of which is occupied by a character included in a set of characters which is ambiguously decoded during each of multiple scans of the label, said method including the steps of:

(a) deriving and storing a preliminary label value following each scan, said preliminary label value having a common set-identifying character assigned to any ambiguous position;

(b) deriving and storing a tentative specific character value for each ambiguous position;

(c) comparing preliminary label values derived from the multiple scans of the same label to determine whether a

particular preliminary label value is corroborated by one or more matching values; and

(d) assigning a final character value for each ambiguous position as a function of the number of times a specific character has been tentatively identified as occupying that position.

4,421,979

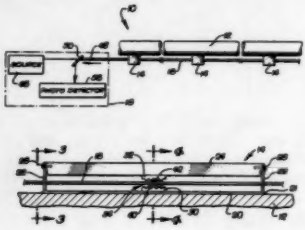
MICROBENDING OF OPTICAL FIBERS FOR REMOTE FORCE MEASUREMENT

Charles K. Asawa, Pacific Palisades, and Shi-Kay Yao, Anaheim, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Aug. 27, 1981, Ser. No. 297,052

Int. Cl.³ G02B 5/14

U.S. Cl. 250—227 32 Claims



12. A system for monitoring forces acting upon a structure, comprising:

an optical fiber extending along the structure;

a plurality of force transducers each operatively associated with said fiber and mounted on the structure for movement in response to a force acting on the structure to induce microbending of said fiber whereby light passing through said fiber is abruptly attenuated at each microbend therein;

means for launching a pulsed optical signal into said fiber for passage therethrough whereby said signal is abruptly attenuated at each microbend in said fiber;

means for detecting the amplitude and longitudinal position of each microbend in said fiber; and

position indicator means interposed between selected ones of said force transducers for detectably altering the light transmissivity characteristics of said fiber to provide a reference for use in identifying which of said transducers is inducing microbending of said fiber.

4,421,980

POSITION ENCODER WITH CLOSED-RING DIODE ARRAY

Christoph Kühne, Giengen, Fed. Rep. of Germany, assignor to Carl-Zeiss-Stiftung, Heidenheim/Brenz, Oberkochen, Fed. Rep. of Germany

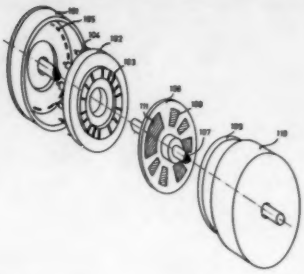
Filed Sep. 16, 1981, Ser. No. 302,711

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1980, 3035012

Int. Cl.³ G01D 5/34

U.S. Cl. 250—231 SE 4 Claims

1. A device for the measurement of angles (position encoder) by means of a scale (106) which is movable relative to a photodiode array (102) consisting of a plurality of individual diodes, the substantially incremental graduation (108) of which scale is projected onto the light-sensitive surface (103) of the array (102), characterized by the fact that a code field (111) is arranged on the graduation (108) of the circular scale (106), that an illuminating device (109) is provided for illuminating the scale, that a diode array (102) is used as a detector, said array being developed as a closed ring onto whose light-sensitive surface (103) the scale graduation (108) is imaged with light from the illuminating device (109), and that the number of



graduations of the scale (106) is equal to the number of diodes of the array (102).

4,421,981

METHOD AND APPARATUS FOR CONDUCTING REMOTE SURVEYS OF THE EARTH'S CRUST

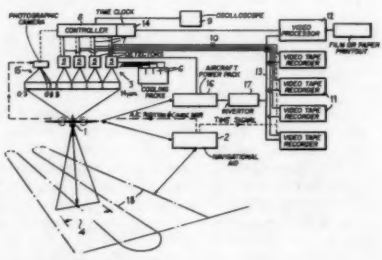
George H. Hough, Cornwall, England, assignor to Forthstar Limited, Cornwall, England

Filed Apr. 28, 1981, Ser. No. 258,256

Claims priority, application United Kingdom, Apr. 29, 1980, 8014026

Int. Cl.³ G01V 5/00; G01J 1/00

U.S. Cl. 250—253 10 Claims



1. A method for remotely surveying the earth's crust, comprising the following steps:

(a) advancing a plurality of electromagnetic scanning devices along a known path at a known height and velocity above the earth's surace;

(b) simultaneously scanning a track of known width on the earth's surface with said scanning devices;

(c) detecting with said scanning devices electromagnetic radiation received from the earth's crust along said scanned track, each scanning device responding to a different spectral range within a predetermined waveband of the electromagnetic spectrum,

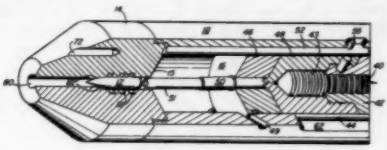
(d) producing a film record from each scanning device corresponding to the intensity of the radiant energy detected by the scanning device within its spectral range, and

(e) scanning each said film record with a flying spot scanner and adjusting the individual rasters of said flying spot scanners to achieve registration of images of said film records produced by said flying spot scanners.

4,421,982
APPARATUS AND METHOD FOR DOWNHOLE INJECTION OF RADIOACTIVE TRACER

Robert M. Potter, Los Alamos; Jacobo R. Archuleta, Espanola, and Conrad F. Fink, Los Alamos, all of N. Mex., (assignors to The United States of America as represented by the U.S. Department of Energy, Washington, D.C. 2182)

Filed Jun. 16, 1980, Ser. No. 159,890
Int. Cl.³ G01V 5/00
U.S. Cl. 250—260 6 Claims



1. A downhole injector for dispersing a material comprising radioactive tracers into fractured strata comprising:

means for receiving and shielding an ampule containing said dispersible material;

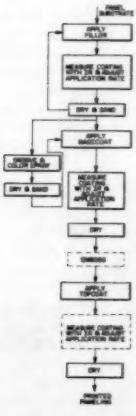
electric motor driven means for breaking said ampule and for forcing its contents from said injector into surrounding strata; and

means for flushing said receiving and shielding means and said breaking means a plurality of times to cleanse them sufficiently of radioactive contamination to allow for their immediate safe handling upon their withdrawal from a borehole.

4,421,983
METHOD FOR MEASURING FILM THICKNESS ON WOOD PANELS USING AN IR ANALYZER

Ozzie Fogle, and Harry E. Back, both of Orangeburg, S.C., assignors to Champion International Corporation, Stamford, Conn.

Filed Mar. 13, 1981, Ser. No. 243,376
Int. Cl.³ G01J 1/00; G05G 15/00; B29C 23/00
U.S. Cl. 250—339 11 Claims

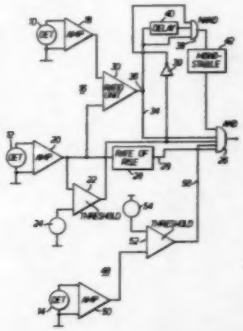


1. A method of manufacturing a plurality of printed paneling units comprising the steps of applying at least one coating of wet filler material, at a rate having a normal thickness range which includes an optimum range to a paneling substrate, sensing the thickness of the coating when wet by sensing absorption of the coating at a selected infrared wavelength to obtain a measurement representative of the thickness and amount of coating applied, and adjusting the rate of application of the filler material to the substrate in accordance with the measurement to the optimum range, then drying the coated substrate, sanding the coated surface, then applying a second coating of wet filler material, at a rate having a normal thickness range which includes an optimum range, to the coated surface, sensing the thickness of the second coating of the filler material while it is still wet by again sensing absorption of the filler material at a selected infrared wavelength to obtain a measurement representative of the accumulated thickness of the coatings applied and adjusting the rate of the application of the second coating of filler material to its optimum range in accordance with the measurement of the second coating, then drying the twice-coated substrate, then sanding the twice-coated substrate, then applying a wet basecoat to the sanded surface, at a rate having a normal thickness range which includes an optimum range, then sensing the thickness of the basecoat while it is still wet by sensing absorption of the basecoat at a selected infrared wavelength to provide a measurement representative of the thickness amount of base coating applied and adjusting the rate of application of the basecoat to its optimum range in accordance with the measurement of the thickness of said basecoat, then drying the applied basecoat, then embossing or printing the paneling with the basecoat applied, then topcoating and curing the topcoat, and then sensing the thickness of the topcoat by the amount of absorption of the topcoat material at a selected infrared wavelength.

4,421,984
FIRE AND EXPLOSION AND DETECTION SUPPRESSION

Robert L. Farquhar, Reading, and David N. Ball, Langley, both of England, assignors to Graviner, Limited, England

Filed Jul. 10, 1981, Ser. No. 282,310
Claims priority, application United Kingdom, Jul. 12, 1980, 8022859
Int. Cl.³ G01J 1/00
U.S. Cl. 250—339 13 Claims



1. A system for discriminating between fires or explosions which need to be detected and those which do not, comprising

first and second radiation detection means respectively arranged to sense the intensity of radiation in different narrow wavelength bands which are selected such that their intensities have a ratio which gives an effective color temperature measure of the radiation source,

ratio means responsive to the outputs of the first and second detection means to produce a first detection signal indicating whether or not the said color temperature is above a predetermined color temperature threshold,

rate of rise means responsive to the output of one of the first and second detection means to produce a second detection signal indicating whether or not the rate of rise of said one

detection means exceeds a predetermined rate of rise threshold,

third radiation detection means arranged to sense the intensity of radiation lying in a narrow wavelength band characteristic of fires or explosions to be detected,

first threshold means responsive to the output from the third detection means to produce a third detection signal indicating whether or not the intensity of radiation received by the third detection means exceeds a predetermined intensity threshold, and

output means responsive to the first, second and third detection signals to determine from them whether or not to produce a control output indicating that the source of radiation is a fire or explosion that needs to be detected,

the system being arranged such that said output means produces its control output only when, simultaneously, the following conditions exist, that is, the first detection signal indicates that the color temperature is below the predetermined color temperature threshold, the second detection signal indicates that the rate of rise of the output of said one detection means is above the predetermined rate of rise threshold and the third detection signal indicates that the intensity of the radiation received by the third detection means is above the predetermined intensity threshold.

4,421,985

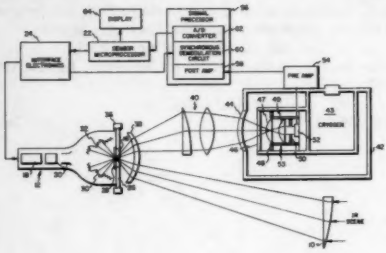
DARK FIELD INFRARED TELESCOPE

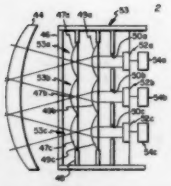
James D. Billingsley, Arlington, and Dayton D. Eden, Dallas, both of Tex., assignors to Vought Corporation, Dallas, Tex.

Filed Jun. 30, 1981, Ser. No. 279,151

Int. Cl.³ G01J *1/00, 1/42*

U.S. Cl. 250—353 **16 Claims**





1. An optical sensor comprising:

a thermoptic modulator positioned in an image plane of the sensor, said modulator having an optical structure substantially nonreflecting of optical energy;

said modulator including means for selectively writing reflective spots at selected coordinates on said optical structure for reflecting optical energy at said reflective spots;

detector means positioned to view said modulator for detecting only the optical energy reflected from said reflective spots written on said modulator, said detected optical energy corresponding to the optical energy from said reflective spots written on said modulator;

means for substantially shielding said detector means from radiation other than radiation reflected from said reflective spots; and

said detector means further including means for generating an output signal representing the radiance of the optical energy reflected from said reflective spots written on said modulator.

4,421,986

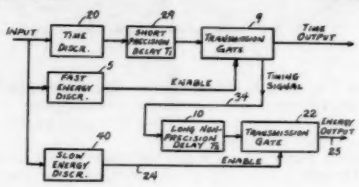
NUCLEAR PULSE DISCRIMINATOR

Walter S. Friauf, and Rodney A. Brooks, both of Bethesda, Md., assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed Nov. 21, 1980, Ser. No. 209,305

Int. Cl.³ G01T *1/20*

U.S. Cl. 250—369 **15 Claims**



1. A discriminator circuit for use with a scintillation detector comprising input terminal means, a time discriminator, means connecting said input terminal means to the input of said time discriminator, a two-input time output transmission gate, means including a short time delay device connecting the output of said time discriminator to one input terminal of said time output transmission gate, means including a fast response energy discriminator connecting said input terminal means to the other input terminal of said time output transmission gate, a two-input energy transmission gate, means deriving a timing signal from said short time delay device, means including a long time delay device connecting said timing signal to one input terminal of said energy transmission gate, and means including a slow response energy discriminator connecting said input terminal means to the other input terminal of said energy transmission gate, said short and long time delay devices each providing a time delay respectively shorter and longer than the decay time of said scintillation detector, and said fast and slow discriminators each havng a time constant respectively shorter and longer than the time constant of said scintillation detector, whereby said energy transmission gate provides an output which is substantially free of outputs caused by low-energy spurious signals entering said intput terminal means.

4,421,987

APPARATUS FOR IRRADIATING DENTAL OBJECTS

Wolf-Dietrich Herold, Hechendorf, Fed. Rep. of Germany, assignor to ESPE Fabrik pharmazeutischer Praeparate GmbH, Seefeld, Oberbayern, Fed. Rep. of Germany

Filed Mar. 16, 1981, Ser. No. 243,852

Claims priority, application European Pat. Off., Mar. 2, 1981, 81101492.7; Fed. Rep. of Germany, Mar. 17, 1980, 8007265[U]

Int. Cl.³ G01J *1/00*

U.S. Cl. 250—492.1 **18 Claims**

1. An apparatus for treating dental objects with radiation in the spectral range from about 400 to 500 nm, comprising:

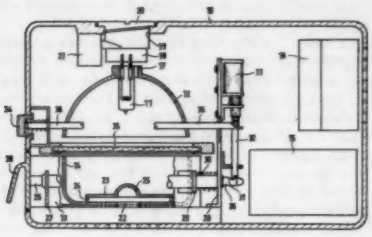
(a) a housing;

(b) support means for holding an object;

(c) a lamp for emitting radiation containing said selected spectral range;

(d) a substantially paraboloid-shaped first reflector partially surrounding the lamp for reflecting radiation of said selected spectral range towards said support means; and

(e) a hollow second reflector disposed on the side of said support means opposite of said first reflector so as to surround said support means and reflect the radiation of said selected spectral range towards said support means;



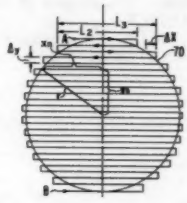
(f) wherein at least one of said first and second reflectors is transmissive for radiation above said selected spectral range to avoid overheating of said dental objects.

4,421,988

BEAM SCANNING METHOD AND APPARATUS FOR ION IMPLANTATION

David A. Robertson, West Newbury, and Norman L. Turner, Gloucester, both of Mass., assignors to Varian Associates, Inc., Palo Alto, Calif.

Filed Feb. 18, 1982, Ser. No. 349,742
Int. Cl.³ G21K *5/00*; H01J *3/28*
U.S. Cl. 250—492.2 **19 Claims**



1. Apparatus for scanning a charged particle beam over a workpiece, said apparatus comprising:

first deflection means for deflection of said beam in response to a first scanning voltage;

second deflection means for deflection of said beam in response to a second scanning voltage, said first and said second deflection means being operative to deflect said beam in mutually perpendicular directions;

first generating means coupled to said first deflection means for generating said first scanning voltage which includes alternating positive ramp portions and negative ramp portions and transitions therebetween, said positive and negative ramp portions being controllable in time duration;

second generating means coupled to said second deflection means for generating said second scanning voltage which remains constant during said positive and negative ramp portions and which is incremented at the time of said transitions between ramp portions;

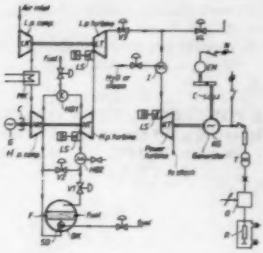
control means for controlling the time durations of said positive and negative ramp portions according to a series of predetermined time durations so as to provide a scan pattern corresponding in size and shape to the size and shape of said workpiece.

4,421,989

POWER PLANT WITH A GAS TURBINE FOR OPERATION OF A GENERATOR

Roine Brännström, Finspong, Sweden, assignor to Stal-Laval Turbin A.B., Finspong, Sweden

Filed Feb. 23, 1982, Ser. No. 351,093
Claims priority, application Sweden, Mar. 5, 1981, 8101415
Int. Cl.³ H02J *3/40*; H02P *9/04*
U.S. Cl. 290—40 R **12 Claims**



1. A electrical power plant comprising:

a fluidized bed combustion chamber,

means to supply fuel to a fluidized bed in the combustion chamber,

a gas turbine plant comprising a compressor part for feeding combustion air to the combustion chamber and a first turbine part driven by combustion gases from the combustion chamber for operating the compressor part, and

a second turbine part with a power turbine and an electrical generator driven thereby,

characterized in that,

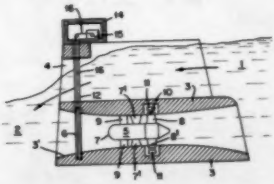
in addition to devices for regulating the combustion in the combustion chamber, the power plant is equipped with at least one means for rapidly influencing the speed of the generator during synchronizing of the generator for connection of the electrical output thereof into an electrical network.

4,421,990

TIDAL POWER PLANT AND METHOD OF OPERATING THE SAME

Valentin Heuss, Uitikon/Waldegg, and Helmut Miller, Bergdietikon, both of Switzerland, assignors to Escher Wyss Limited, Zurich, Switzerland

Filed Aug. 30, 1982, Ser. No. 412,894
Claims priority, application Switzerland, Sep. 29, 1981, 6251/81
Int. Cl.³ F03B *13/12*; E02B *9/08*
U.S. Cl. 290—53 **18 Claims**



1. A tidal power plant for generating energy from tidal movement of water, comprising:

means providing a main channel subject to tidal flows and arranged between a sea body and a single storage reservoir separated from the sea body;

at least one water turbine disposed in said main channel

subject to tidal flows and arranged between said sea body and said single storage reservoir;

a connection channel arranged above said turbine between said sea body and said single storage reservoir;

a common shutoff device located at one end of said at least one turbine and operable under pressure to selectively control the flow of water through the main channel and the turbine located therein and the connection channel alternatively and in opposite directions;

said common shutoff device comprising a slidable shutoff element;

substantially vertical slit means in which there is slidable said common shutoff device; and

said shutoff element comprising a slidable panel flood gate.

4,421,991

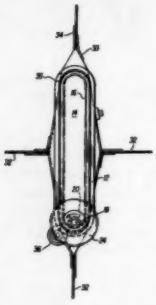
WAVE POWERED ELECTRICAL GENERATOR

Owen L. McLaughlin, 193 Seneca Cir., Winfield, W. Va. 25213

Filed Sep. 27, 1982, Ser. No. 423,862

Int. Cl.³ F03B *13/12*

U.S. Cl. 290—53 **6 Claims**



1. Apparatus for generating electrical energy from fluid waves comprising at least one hollow, buoyant vane movable by the waves, each vane having an elongated slot, a shaft connected to said vane and rotated by movement of said vane, gear means disposed in said slot and connected to said shaft to enable relative longitudinal movement of said shaft and vane during rotation of said vane, an electrical generator, coupling means connecting said shaft to said electrical generator, and weighting means inside said vane and movable to vary the center of gravity of said vane during rotation of said vane.

4,421,992

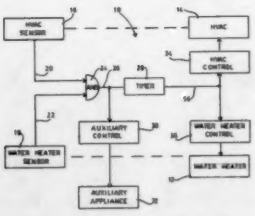
SMART SWITCH

Ray W. Hibbard, and Randal C. Hines, both of Morristown, Tenn., assignors to Nuclear Systems, Inc., Morristown, Tenn.

Filed Dec. 4, 1981, Ser. No. 327,406

Int. Cl.³ H02J *3/00*

U.S. Cl. 307—41 **12 Claims**



12. Apparatus for preventing the simultaneous application of electrical power to first and second electrical loads comprising:

a first and second sensing means, one each connected to said first and second electrical loads respectively, for determining when said first and second electrical loads demand electrical power, and for providing first and second sensing signals respectively indicative of such demand;

combining means for receiving first and second representative signals which are representations of said first and second sensing signals respectively and for providing a timer start signal when both said first and second representative signals are equally present at said combining means;

first and second load control means connected to said first and second electrical loads for alternately applying and interrupting electrical power to said first and second electrical loads respectively in response to a control signal;

timing means suitable for providing said control signal to said first and second load control means, upon receiving said timer start signal, such that said electrical loads are prevented from simultaneously receiving electrical power; and

first and second latching means for providing said first and second representative signals respectively whenever said timing means is operating regardless of whether or not said sensing means are providing corresponding sensing signals, wherein said first representative signal provided by said first latching means corresponds to the actual state of said first sensing signal only when one of said timing start signals and a high level of said control signal is present, and always provides a high signal when both said timing start signals and said high level of said control signal are present.

4,421,993

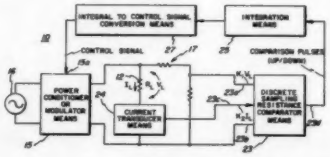
LOAD RESISTANCE CONTROL CIRCUITRY

Milton D. Bloomer, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed May 28, 1982, Ser. No. 382,875

Int. Cl.³ H01H *47/00*

U.S. Cl. 307—126 **28 Claims**



1. A circuit for controlling the resistance of a load having a non-zero resistance temperature coefficient and receiving energy from an electrical source, comprising:

means connected between said source and said load for varying the temperature of said load by adjustment of the magnitude of periodic current pulses flowing through said load responsive to a control signal;

means for monitoring the resulting voltage pulse across said load to provide a first pulse signal;

means for monitoring the current pulse flowing through said load to provide a second pulse signal;

comparison means, receiving said first and second pulse signals and first and second substantially-constant reference signals, for providing an output signal having a characteristic indicative of the time at which the magnitude of said first pulse signal exceeds the magnitude of the first reference signal with respect to the time at which the magnitude of said second pulse signal exceeds the magnitude of the second reference signal; and

means for providing said control signal responsive to said comparison means output signal to cause the load current pulse magnitude and said load temperature to vary in a

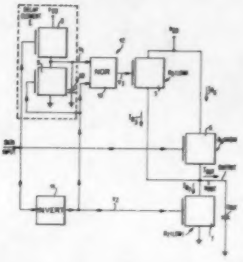
manner to cause said resistance to be maintained at a substantially constant, predetermined value.

4,421,994

HIGH SPEED LINE DRIVER WITH GROUND OUTPUT CAPABILITY

Yogi K. Puri, Vienna, and Keith M. A. Selbo, Manassas, both of Va., assignors to IBM Corporation, Armonk, N.Y.

Filed Nov. 2, 1981, Ser. No. 317,659
Int. Cl.³ H03K *3/01, 3/26*
U.S. Cl. 307—200 B **10 Claims**



1. An FET driver circuit with an output shorting protection feature, comprising:

an active FET device having its source/drain path connected between ground potential and an output node and its gate connected to an input node, for switching off its source/drain path when a first polarity input signal is applied to said input node;

a first, relatively low resistance FET load device having its source/drain path connected between a drain potential and said output node, for selectively providing a relatively fast charging current path to said output node in response to a signal on its gate;

a second, relatively high resistance FET load device having its source/drain path connected between said drain potential and said output node and having a gate connected to said input node, for selectively providing a relatively slow charging current path to said output node when said first polarity signal is applied to said input node;

switching means having an input connected to said input node and an output connected to said gate of said first FET load device, for turning on said fast charging current path when said input signal transitions from ground potential to said first polarity and for turning off said fast charging current path after a predetermined delay;

whereby said output node is provided with a fast charging current when said input signal begins said first polarity state and then said output node is thereafter protected from ground shorts by having a high resistance as its sole connection to said drain potential.

4,421,995

TIMING DISCRIMINATOR USING LEADING-EDGE EXTRAPOLATION

Bernard Gottschalk, Palo Alto, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jul. 30, 1981, Ser. No. 288,562
Int. Cl.³ H03K *5/153*
U.S. Cl. 307—361 **10 Claims**

1. A timing discriminator for recovering timing information from slow-rising input pulses, which comprises:

a voltage divider for setting a threshold voltage at a predetermined voltage;

a first means for comparing said input pulses with said threshold voltage;

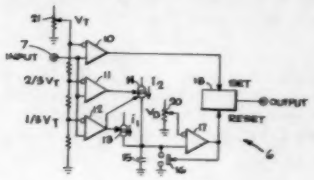
a flip-flop circuit means connected to said first comparing means and set by said first comparing means when said input pulses reach said threshold voltage;

a second means for comparing said input pulses with two-thirds said threshold voltage;

a third means for comparing said input pulses with one-third said threshold voltage;

a first means for generating current connected to said third comparing means and switched on by said third comparing means when said input pulses reach one-third of said threshold voltage;

a second means for generating current connected to said second comparing means switched on by said third comparing means when said input pulses reach one-third of said threshold voltage and switched off by said second



comparing means when said input pulses reach two-thirds of said threshold voltage;

a capacitor connected to said first and second generating means and charged by said first and second generating means;

a bias divider for setting a bias voltage at a predetermined level;

a fourth means for comparing said capacitor voltage with said bias voltage and for resetting said flip-flop circuit means when said capacitor voltage reach said bias voltage; and

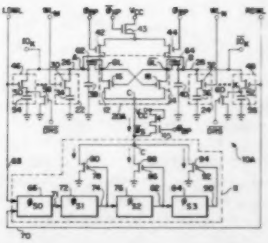
a clamping circuit means connected to said fourth comparing means and said capacitor for discharging said capacitor when said capacitor voltage reaches said bias voltage.

4,421,996

SENSE AMPLIFICATION SCHEME FOR RANDOM ACCESS MEMORY

Patrick T. Chuang, Cupertino, and Paul D. Keswick, San Jose, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Oct. 9, 1981, Ser. No. 310,180
Int. Cl.³ H03K *5/24;* **G01R** *19/165;* **G11C** *7/06*
U.S. Cl. 307—530 **11 Claims**



1. For use in a capacitive storage integrated circuit memory device having at least one sense amplifier of a type employing a latch including cross-coupled field effect transistors with common source electrodes, said sense amplifier for sensing and comparing charge on a bit line coupled to each drain electrode of each one of said transistors of said latch, each said bit line being selectively coupled to a storage cell through a transistor

switch transfer gate in response to signals applied to a word line, an apparatus for controlling sense rate of said bit lines comprising:

means operative to sense said word line signals for initiating a clock sequence, said clock sequence initiating means producing a first output signal having a first dynamic characteristic which is delayed relative to said word line signals;

first clock means responsive to said first output signal for generating a second output signal having a second dynamic characteristic which is delayed relative to said first output signal;

second clock means responsive to said second output signal for generating a third output signal having a third dynamic characteristic which is delayed relative to said second output signal and which overlaps in time said second output signal; and

means operative to amplify current in proportion to at least said second output signal and to said third output signal and to sum said amplified current for applying current in a controlled manner to said common source electrodes to strobe said source electrodes at a controlled sense rate.

4,421,997

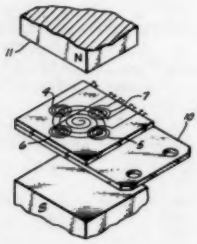
MULTIPLE AXIS ACTUATOR

Edward L. Forys, Covina, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Continuation of Ser. No. 943,063, Sep. 18, 1978, abandoned. This application Nov. 13, 1981, Ser. No. 321,083

Int. Cl.³ H02K *41/02*

U.S. Cl. 310—12 **20 Claims**



1. A force producing apparatus comprising:

a. a single pair of opposed magnetic poles for establishing a monogeneous magnetic field having flux lines aligned in the same direction from pole to pole; and

b. means for producing force in a direction substantially parallel to the flux lines of said magnetic field comprising at least a pair of electrically conductive spiral windings positioned within said magnetic field for interacting therewith, the windings of said pair being wound in like directions in adjacent parallel planes generally orthogonal to said flux lines and connected together at the inner ends of the spirals, said windings being displaced from each other in a direction aligned with the magnetic field by a predetermined distance sufficient to develop, when the windings are energized, like magnetic poles on opposite sides of said winding pair for interacting with said magnetic field to develop a force in the direction of said field.

4,421,998

COMPACT ALTERNATOR FOR A SELF-CONTAINED ON-BOARD ELECTRIC NETWORK, PARTICULARLY FOR AN AUTOMOTIVE VEHICLE

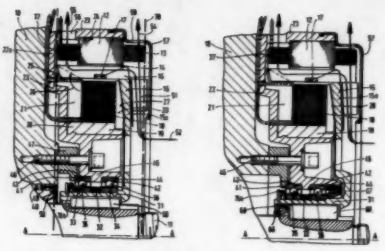
Peter Ahner, Ludwigsburg; Helmut Harer, Remseck, and Siegfried Schustek, Immenstaad, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Nov. 1, 1982, Ser. No. 438,413

Claims priority, application Fed. Rep. of Germany, Nov. 6, 1981, 3144063; Mar. 2, 1982, 3207385

Int. Cl.³ H02K *11/00*

U.S. Cl. 310—68 R **26 Claims**



1. Alternator for a self-contained electrical network, and adapted for coupling to a drive shaft (11) of a variable speed drive engine having

a carrier structure (22, 122) defining a cylindrical cavity therein;

an armature structure including an armature core (12) and an armature winding (13) located in said cavity;

an essentially cylindrical exciter or field structure (20, 120) having a diameter less than the inner diameter of said armature core (12) to define a flux path gap therewith, concentrically located in said cavity and secured to said carrier structure, and including a field winding (18);

a claw pole rotor (15) having claw poles (16; 90, 116) located within said flux path gap and spaced from the outer circumference of the cylindrical field structure by an inner air gap, and from the inner circumference of the armature by a second air gap;

wherein, in accordance with the invention

the carrier structure (22, 122) includes a radially extending portion (22*a*, 122*a*) adapted for attachment to a fixed support,

an outer axially extending portion (23) surrounding said cylindrical cavity,

and an inner axially extending cylindrical portion (45, 145) projecting concentrically to the shaft (11);

the rotor (15, 115) includes a radially extending portion (15*a*, 115*a*) and a re-entrant portion (31, 131) located beneath the exciter or field structure (20, 120) and forming a hub;

means (60, 70) are provided rotatably coupling the hub to the engine drive shaft (11);

and roller-type bearings (35, 36; 76*a*; 135, 136) are provided located between the outer circumference of the hub and the inner cylindrically extending portion (45, 145) of said carrier structure (22);

wherein the armature windings (13) has outer end portions which are located between two planes (37, 38) extending essentially at right angles to axis of rotation (A—A) of the rotor;

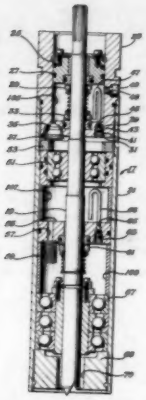
and wherein the bearings are located between said planes

whereby the axial thickness of the alternator is essentially defined by said planes and limited, essentially, to the axial extent of said armature windings (13).

4,421,999
SUBMERSIBLE PUMP SEAL SECTION WITH MULTIPLE BELLOWS

John A. Beavers, and Raymond L. Witten, both of Tulsa, Okla., assignors to Hughes Tool Company, Houston, Tex.

Filed Mar. 2, 1981, Ser. No. 239,767
Int. Cl.³ H02K 5/12
U.S. Cl. 310—87 10 Claims



1. In a submersible pump assembly of the type having a motor section with a shaft extending through a seal section to a pump, an improved means for reducing pressure differential between lubricant fluid in the motor and seal sections and well fluid, comprising in combination:

a partition in the seal section, dividing the motor and seal sections into a primary chamber and a secondary chamber, with the shaft sealingly passing through the partition;

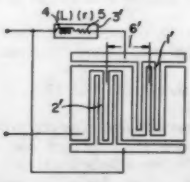
a primary pressure compensator means separating well fluid from lubricant fluid in the primary chamber, for reducing pressure differential between the lubricant in the primary chamber and well fluid;

a secondary pressure compensator means mounted to a port in the partition, separating lubricant fluid contained in the secondary chamber from lubricant fluid contained in the primary chamber, for reducing pressure differential between lubricant in the secondary chamber and lubricant in the primary chamber.

4,422,000
UNIDIRECTIONAL SURFACE ACOUSTIC WAVE DEVICE WITH MEANDERING ELECTRODE

Jun Yamada, Yokohama, and Katashi Hazama, Zushi, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 4, 1982, Ser. No. 374,758
Claims priority, application Japan, May 8, 1981, 56-68340
Int. Cl.³ H03H 9/145
U.S. Cl. 310—313 D 6 Claims



1. A surface acoustic wave device comprising an interdigital input transducer and an interdigital output transducer formed on a piezoelectric substrate, at least one of said input and output transducers being unidirectional and having an interdigital sending electrode part disposed nearer to the other transducer and an interdigital reflecting electrode part disposed apart from the other transducer, a common electrode disposed between said sending and reflecting electrode parts, an electrical phase difference being provided between said sending and reflecting electrode parts, in which the electrical phase difference between said sending and reflecting electrode parts is established to be ϕ in the unit of radians, which is not equal to $\pi/2$ radians and a distance between said sending and reflecting electrode parts providing a geometrical phase difference therebetween is established to be

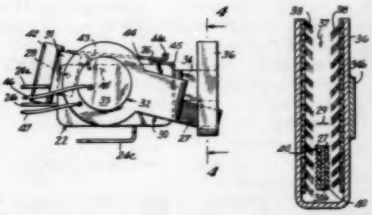
$$\left(n + \left(\frac{1}{2} - \frac{\phi}{2\pi}\right)\right)\lambda_0$$

where n is a positive integer and λ_0 is the wavelength of a surface acoustic wave.

4,422,001
CRYSTAL VIBRATOR ACTUATED RELAY

Gerhart Weiss, 76-70 172nd St., Flushing, N.Y. 11366

Filed Jun. 5, 1981, Ser. No. 270,940
Int. Cl.³ H01H 45/00; H04R 17/00
U.S. Cl. 310—328 24 Claims



1. A relay device comprising switch means; first lever means coupled to said switch means for actuation thereof and displaceable between first and second positions, said switch means being "open" at one of said first and second positions of said lever means and being "closed" at the other of said first and second positions of said lever means; and vibrator means coupled through a coupling means to said lever means, said coupling means effecting displacement of said lever means between said lever means first and second positions in response to the vibration of said vibrator means, said coupling means including first and second interactive coupling members, said first coupling member being joined to said vibrator means for vibration thereby, one of said vibrator means and said second coupling member being fixed relative to said switch means, the other of said vibrator means and said second coupling member being displaceably mounted relative to said swtich means and joined to said lever means for displacement by the interaction of the vibration of said first coupling member relative to said second coupling member to effect displacement of said lever means between said first and second positions, one of said first and second coupling members including a plurality of projections distributed in the direction of relative displacement of said first and second coupling members, the other of said first and second coupling members including a plurality of resilient fingers facing said projections and adapted to displace the moveable one of said first and second coupling members in said direction in response to the periodic interengagement of said resilient fingers and said projections caused by the vibration of said vibrator means.

4,422,002

PIEZO-ELECTRIC TRAVELLING SUPPORT

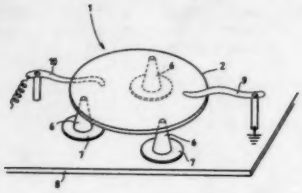
Gerd Binnig, Richterswil; Hermann Nievergelt, Adliswil; Heinrich Rohrer, Richterswil, and Edmund Weibel, Adliswil, all of Switzerland, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 9, 1982, Ser. No. 406,653

Claims priority, application European Pat. Off., Aug. 10, 1981, 81106229.8

Int. Cl.³ H01L *41/08*

U.S. Cl. 310—328 7 Claims



1. Apparatus for producing precise minute controlled linear and rotary displacements of an assembly with respect to a base member, comprising

a piezo-electric crystal assembly having electrodes on opposed parallel surfaces thereof;

individual electrical connections to the said electrodes, which connections do not restrict movement of the crystal assembly;

a plurality of electrically conductive support legs electrically insulated from said crystal assembly and yieldingly affixed thereto;

an electrically conductive base member with respect to which said crystal assembly with affixed legs is operative to move;

a dielectric member interposed between said legs and said base member;

electrical connections to each of said legs and to said base member; and

means for selectively applying timed electrical potentials respectively between said electrodes, and between each of said legs and said base member whereby the potential applied between a leg and the base member produces a clamping force to restrict the movement of that leg with respect to the base, and the potential applied between said electrodes produces a change in the dimension of the crystal resulting in movement of the non-clamped legs with respect to said base member.

4,422,003

PERFORATED PZT POLYMER COMPOSITES

Ahmad Safari; Robert E. Newnham; Leslie E. Cross, and Walter A. Schulze, all of State College, Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 16, 1982, Ser. No. 408,320

Int. Cl.³ H01L *41/08*

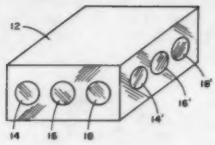
U.S. Cl. 310—358 10 Claims

1. A PZT-polymer composite material of 3-1 connectivity which comprises:

a matrix of PZT;

means for electrically poling said matrix of PZT; and

a plurality of generally parallel voids partially filled with an inactive polymer in said matrix of PZT, said voids partially filled of the inactive polymer having axes thereof



perpendicular to the direction of polarization of said matrix of PZT.

4,422,004

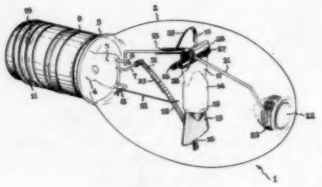
TRANSVERSE ARC TUBE MOUNTING

David C. Knecht, Columbus, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Jun. 24, 1981, Ser. No. 276,878

Int. Cl.³ H01J *61/30*

U.S. Cl. 313—25 5 Claims



1. An electric lamp comprising:

an outer envelope having a bulb portion with a reduced diameter neck portion having lead-in wires sealed therethrough,

a base fastened to the neck portion,

an arc tube within the bulb portion of greater overall length than the internal diameter of the neck portion, said arc tube having electrodes attached to inleads sealed into opposite ends,

and a mount structure comprising a support rod extending from one of said lead-in wires into the bulb portion and a hinged attachment of one end of said arc tube to said rod allowing the arc tube to be swung out of the way for passage through the neck and thereafter to be swung transversely within the bulb,

and means for locking said arc tube in transverse orientation comprising a two-piece connector having a bendable knee joint extending from a lead-in wire in said stem to the inlead in said arc tube opposite its hinged end.

4,422,005

CHANNEL PLATE ELECTRON MULTIPLIER

Derek Washington, Wallington, and Alan G. Knapp, Crawley, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 29, 1981, Ser. No. 278,128

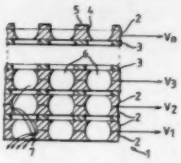
Claims priority, application United Kingdom, Jul. 9, 1980, 8022539

Int. Cl.³ H01J *43/22*

U.S. Cl. 313—105 CM 10 Claims

1. A channel plate electron multiplier comprising, a stack of conducting sheet dynodes insulated from one another, channels passing transversely through the stack, each channel comprising aligned holes in the dynodes and the walls of the holes having a secondary electron emissive surface, and a layer of material having a secondary electron emission coefficient less

than 2.0 deposited on a carrier sheet placed in contact with the outermost surface of the input dynode, said carrier sheet having holes registering with the input dynode holes, and said material lying between the holes in said carrier sheet.



4,422,006

ELECTROCHEMICAL LUMINESCENT CELL

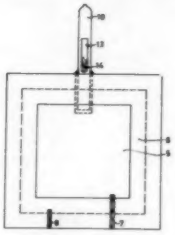
Hartwig Schaper, Roetgen, and Karl H. Wilhelm, Aachen, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 8, 1981, Ser. No. 271,301

Claims priority, application Fed. Rep. of Germany, Sep. 6, 1980, 3021587

Int. Cl.³ H01K *1/52*

U.S. Cl. 313—483 **6 Claims**



1. An electrochemical luminescent cell having a fill which contains an electrochemical luminescent material and a solvent as the filling components, characterized in that the cell contains a getter material which does not react with the filling components, and which chemically or physically binds contaminations present in the cell or converts them into compounds which do not cause disturbances.

4,422,007

LUMINESCENT SUBSTANCES HAVING A BASE OF DOUBLE BORATE OF MAGNESIUM AND RARE EARTHS AND LOW PRESSURE MERCURY VAPOR LAMP CONTAINING THE SAME

Claude Fouassier, Gradignan, and Bernadette Saubat, Seyssinet, both of France, assignors to Rhone Poulenc Industries, Paris, France

Filed Jun. 17, 1981, Ser. No. 274,362

Claims priority, application France, Jun. 27, 1980, 80 14307

Int. Cl.³ C09K *11/475*; H01J *1/63*

U.S. Cl. 313—486 **4 Claims**

1. A luminescent substance characterized by the fact that it has a monoclinic crystalline structure and by the fact that it consists of a double borate of magnesium and rare earths and has the general formula $Ln_{1-x}Tb_xMgB_5O_{10}$ in which Ln represents at least one element selected from the group consisting of La, Gd, Lu, and Y and in which $0 \leqq x \leqq 1$; Tb being present in an amount sufficient to effect an intense narrow emission peak at about 538 nm.

4,422,008

ELECTRON TUBE HAVING A PHOTOELECTRIC SCREEN

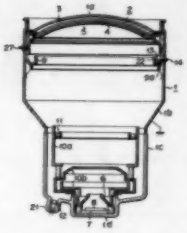
Yoshimitsu Aramaki, Kawasaki, and Norio Haruo, Ayase, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Oct. 20, 1981, Ser. No. 312,981

Claims priority, application Japan, Oct. 22, 1980, 55-150615[U]

Int. Cl.³ H01J *40/00*

U.S. Cl. 313—524 **6 Claims**



1. An electron tube which comprises:

a metal vacuum envelope;

a metal high energy ray input window fitted to the envelope; and

a photoelectric screen held in the metal vacuum envelope in the proximity of the high energy ray input window,

and is characterized in that a semiconductor photosensor is set at that position within the metal vacuum envelope which lies near the peripheral edge of the photoelectric screen and to which a material constituting the photoelectric screen can be deposited, said semiconductor photosensor being formed of a sealed container provided with a light input window and a semiconductor element received in the container.

4,422,009

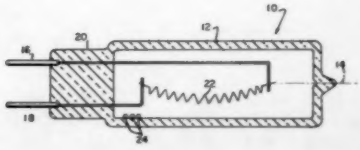
TUNGSTEN-HALOGEN INCANDESCENT LAMP CONTAINING ADDITIVE TO REDUCE FILAMENT SAG

John W. Shaffer, Williamsport, Pa., assignor to GTE Products Corporation, Stamford, Conn.

Filed Apr. 28, 1982, Ser. No. 372,513

Int. Cl.³ H01K *1/62*

U.S. Cl. 313—579 **2 Claims**



1. A tungsten-halogen incandescent lamp comprising: a light transmitting, hermetically sealed glass envelope; two lead-in wires hermetically sealed in a press of said envelope and extending internally and externally thereof; a tungsen filament attached between the internal ends of said lead-in wires; a fill gas in said envelope, said fill gas comprising an inert gas and a halogen at relatively high pressure; and an effective amount of a component to reduce filament sag included within said envelope, said component being selected from the group consisting of bismuth, antimony and tellurium or combinations thereof.

4,422,010

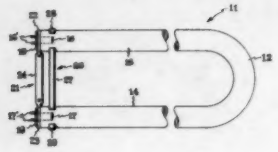
SHAPED DISCHARGE LAMP WITH STARTING AID

Edward E. Hammer, Mayfield Village, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 253,089, Apr. 13, 1981, abandoned. This application Apr. 23, 1982, Ser. No. 371,143

Int. Cl.³ H01J 61/30, 61/54

U.S. Cl. 313—594 8 Claims



1. A mercury vapor discharge lamp comprising an elongated bulb shaped so that its ends are substantially closer together than if the bulb were straight and containing electrodes respectively near said ends thereof, and a starting aid comprising conductive means respectively adjacent to said bulb in the vicinity extending from the base to about the position of said electrodes of said ends, and spatially extending means electrically interconnecting said conductive means, said starting aid being devoid of means for connection to a starting voltage source.

4,422,011

HIGH-PRESSURE MERCURY VAPOR DISCHARGE LAMP

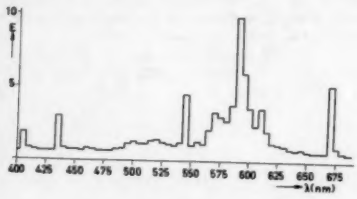
Leonce M. J. Bruninx-Poesen; Peter C. Drop; Lambert C. I. Kaldenhoven; Roland Lorenz, and Willy J. C. Endevoets, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 30, 1981, Ser. No. 307,129

Claims priority, application Netherlands, Oct. 2, 1980, 8005456

Int. Cl.³ H01J 61/20

U.S. Cl. 313—642 3 Claims



1. A high-pressure mercury vapour discharge lamp, the emitted radiation of which has a white color aspect, comprising a gas-tight, radiation-permeable discharge vessel, means for maintaining a discharge and in addition an ionizable filling within said discharge vessel consisting of a rare gas, mercury, a sodium halide and at least one halide of at least one of the rare earth metals selected from the group consisting of cerium, praseodymium, neodymium and lutetium, the lamp being suitable for a nominal consumed power in the range of from 10 to 2000 W, characterized in that the molar ratio of the rare earth metal Ln to sodium, Ln:Na, has a value in the range from 1:20 to 1:1, and that the quantity of mercury per cm^3 volume of the discharge vessel, A, has a value in the range from 2 to 100 mg/cm^3, wherein Ln:Na and A values are in inverse relationship to the value of said nominal consumed power.

4,422,012

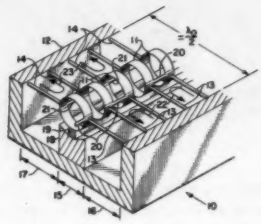
LADDER SUPPORTED RING BAR CIRCUIT

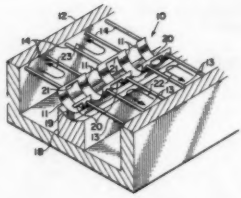
Henry G. Kosmahl, Olmsted Falls, Ohio, assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Apr. 3, 1981, Ser. No. 251,009

Int. Cl.³ H01J 25/34

U.S. Cl. 315—3.5 12 Claims





1. A slow wave structure for a backward wave oscillator tube, said slow wave structure being disposed in a wave guide and comprising:

a plurality of rings disposed in axial alignment in said waveguide, said rings being coaxial with the longitudinal center of said waveguide;

a first plurality of electrically conducting stubs extending inwardly from one wall of said waveguide, each stub being attached to a respective ring;

a second plurality of electrically conducting stubs extending inwardly from a wall of said waveguide opposite said one wall, each stub being attached to a respective ring;

a first plurality of electrically conductive connecting bars extending axially in alternate spaces between said rings at the points of attachment of said plurality of stubs to respective ones of said rings; and

a second plurality of electrically conductive connecting bars extending axially between said rings in the spaces not including said first connecting bars and at the points of attachment of each of said second plurality of stubs to a respective ring, whereby currents in said first connecting bars and in said second connecting bars are in opposite directions to establish magnetic fields resulting in a high impedance characteristic for said slow wave structure; and

a longitudinal ridge member of electrically conducting, non-magnetic material having high thermal conductivity attached to the inside of each of third and fourth walls of said waveguide and a longitudinal spacer of an electrically nonconductive material having high thermal conductivity disposed between and contacting each ridge member and all of said rings to conduct heat away from said rings, stubs and bars.

7. A slow wave structure (SWS) for a backward wave oscillator said SWS being disposed in a rectangular waveguide having first, second, third and fourth walls, said SWS comprising;

a plurality of generally half-circle, bowed members disposed in said waveguide in alignment with each other as viewed from either end of said waveguide;

a first plurality of stubs extending from said first wall of said waveguide, each of said stubs being attached to one end of a repective one of said half-circle members; and

a second plurality of stubs extending from said second wall of said waveguide, each of said stubs being attached to the other end of a respective one of said half circle members; and

a first plurality of electrically conductive connecting bars extending axially in alternate spaces between points on said half rings intersected by said stubs;

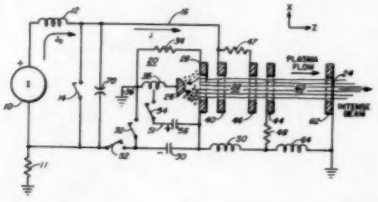
a second plurality of electrically conductive bars extending axially between said rings in the spaces not including said first connecting bars and at the points of attachment of each of said second plurality of stubs to a respective ring, whereby currents in said first connecting bars and in said second connecting bars are in opposite directions to establish magnetic fields resulting in a high impedance characteristic for said SWS.

4,422,013

MPD INTENSE BEAM PULSER

Peter J. Turchi, Alexandria, Va., and Ihor M. Vitkovitsky, Silver Spring, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 21, 1981, Ser. No. 285,690
Int. Cl.³ H01J 27/02
U.S. Cl. 315—111.81 **15 Claims**



1. An MPD intense beam pulser for generating high voltage, intense charged particle beams comprising:

a plasma channel device including

a high speed source of directed plasma;

a diode with an aperture therein disposed to accelerate the particles of the plasma emitted from said plasma source and including a volume therearound for inductive energy storage; and

a high energy particle window disposed to pass therethrough accelerated particle beams emerging from the diode aperture;

means for directing a current through said diode in order to inductively store energy in the magnetic field generated around said diode; and

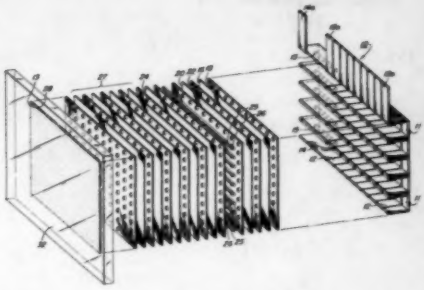
means for truncating the plasma flow from said plasma source in order to cause a rapid decrease in plasma density resulting in the production of an intense beam of charged particles directed through said high energy particle window of said plasma channel device.

4,422,014

METHOD AND APPARATUS FOR OBTAINING A FOCUSABLE BEAM OF ELECTRONS FROM A GASEOUS HOLLOW-CATHODE DISCHARGE

David Glaser, 1918 Raymond Dr., Northbrook, Ill. 60062

Filed Nov. 12, 1981, Ser. No. 320,325
Int. Cl.³ H05B 37/00
U.S. Cl. 315—169.4 **20 Claims**



14. For use in a cathodoluminescent display device of a type wherein a luminescent target is scanned by an electron beam, the combination comprising

means including a cathode for generating a gas discharge for use as a source of electrons,

an electron-transmissive extraction electrode spaced from said cathode and biased at a positive potential relative to said cathode for extracting electrons from said discharge,

an electron-transmissive repeller electrode positioned in proximity to said extractor electrode for intercepting electrons from said source which pass through said extractor electrode,

said repeller electrode being biased at a potential which is positive relative to said cathode and negative relative to said extractor electrode, and

said extractor and repeller electrodes being spaced from said cathode by a distance substantially less than the mean free path of the electrons from said source,

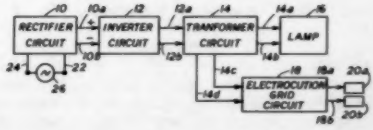
whereby only electrons having at least a predetermined energy level are transmitted by said repeller electrode.

4,422,015

ELECTRIC INSECT TRAP POWER SUPPLY

Ole K. Nilssen, 1984 Caesar Dr. - Rte. 5, Barrington, Ill. 60010

Filed Mar. 20, 1981, Ser. No. 246,006
Int. Cl.³ H04B 37/02, 41/36; H05C 1/02; A01M 1/22
U.S. Cl. 315—209 R **32 Claims**



1. A power supply for an electric insect trap having an electrocution grid for killing insects and a fluorescent lamp for attracting insects to the grid, comprising:

means including an inverter for generating an alternating voltage;

means responsive to said alternating voltage for providing a limited current to operate the fluorescent lamp; and

means responsive to said alternating voltage for producing a current-limited high voltage for application to the electrocution grid, said current-limited high voltage being sup-

plied by way of a manifest current-limiting-means that is operative to limit the current supplied to the grid to a distinct pre-established maximum level.

4,422,016

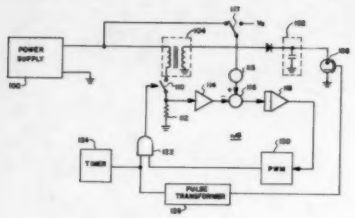
CONSTANT ENERGY TRANSFER RATE STROBE SOURCE

William M. Kurple, Urbana, Ohio, assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Oct. 22, 1981, Ser. No. 313,744

Int. Cl.³ H05B *37/00*

U.S. Cl. 315—241 S **14 Claims**



1. In a strobe light wherein capacitance means is successively charged by a power source and discharged through a strobe lamp, the charge control system comprising:

charging means for coupling said power source to said capacitance means;

energy transfer means connected to said charging means including switch means connected into the input side of said charging means to control the duty cycle of the input current to said charging means and switch control means monitoring the input to said charging means including pulse width modulator means connected to drive said switch means, thereby regulating the rate of energy transfer between said ppower source and said capacitance means generally to a preselected energy transfer rate; and,

timer means operatively connected to said energy transfer means for setting a preselected duration in which energy is transferred from said power source to said capacitance means, whereby charging the capacitance means at the preselected energy transfer rate for the preselected energy transfer duration sets the amount of energy with which the capacitance means is charged.

4,422,017

ELECTRODELESS GAS DISCHARGE LAMP

Jan W. Denneman; Hendrik B. B. van Dam, and Petrus F. A. Wouters, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

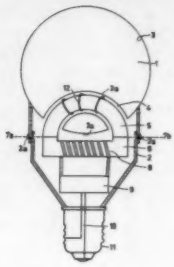
Continuation of Ser. No. 120,968, Feb. 13, 1980. This application Aug. 11, 1982, Ser. No. 407,185

Claims priority, application Netherlands, Mar. 9, 1979, 7901897

Int. Cl.³ H05B *41/16, 41/24*

U.S. Cl. 315—248 **16 Claims**

1. An electrodeless gas discharge lamp having a lamp base and a lamp vessel having an elongated tubular channel extending completely through said lamp vessel and having a fluid tight wall with no fluid communication between the interior of said channel and the interior of said vessel, said vessel being filled with a metal vapor and one or more rare gases, the lamp comprising a closed loop core of a magnetic material, part of said core extending through the lamp vessel, a high frequency magnetic field being induceable in the core by means of an h.f. generator in the lamp base characterized in that the magnetic core is assembled from at least two separable core portions, at least a major part of one portion lying within said channel, said channel being dimensioned and configured for passage of said major part thereinto, said major portion being semi-circular shaped, and the other of the two portions being located in the lamp base, the lamp base being detachably secured to the lamp



vessel, said part of said one core portion which lies mainly within the lamp vessel being disposed in said elongated channel formed as part of the lamp vessel.

4,422,018

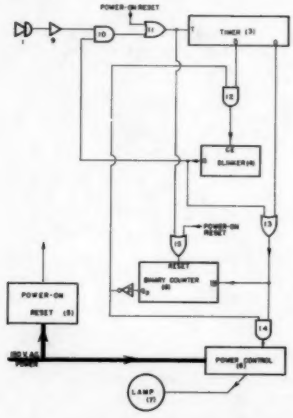
AUTOMATIC LIGHTING DISCONNECT TIMER INCORPORATING AN ACOUSTIC ABORT SWITCH

Alan S. Bailey, 50 Keegans La., Great Kills, Staten Island, N.Y. 10308

Continuation of Ser. No. 241,108, Mar. 6, 1981, abandoned. This application Sep. 9, 1982, Ser. No. 416,257

Int. Cl.³ H05B *37/02*

U.S. Cl. 315—360 **10 Claims**



1. Apparatus for controlling an electrical circuit that will automatically disconnect or open the circuit after a predetermined time interval and to interrupt the disconnecting or opening of the circuit and reset the predetermined time interval in response to an acoustic signal comprising in combination timing means capable of being set for a predetermined time interval to maintain the circuit in an operating mode for said predetermined time interval and including means to interrupt the circuit and open the same at the termination of said predetermined time interval, and means for generating a signal near the termination of said predetermined time interval indicating the approaching termination thereof; acoustic means connected to the timing means for generating a signal in response to acoustic stimulation and aborting the completion of said predetermined

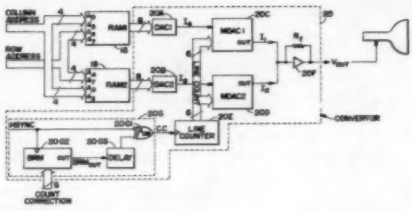
time interval and means for resetting said predetermined time interval in response to the signal from said acoustic means.

4,422,019

APPARATUS FOR PROVIDING VERTICAL AS WELL AS HORIZONTAL SMOOTHING OF CONVERGENCE CORRECTION SIGNALS IN A DIGITAL CONVERGENCE SYSTEM

William W. Meyer, Oregon City, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Jul. 12, 1982, Ser. No. 397,615
Int. Cl.³ H01J 29/70, 29/76
U.S. Cl. 315—368 4 Claims



1. An interpolator for use in a convergence system, said convergence system developing convergence correction signals for deflecting an electron beam while scanning across the inner surface of a cathode ray tube, the surface of said cathode ray tube being subdivided into a matrix including a plurality of intersecting rows and columns, each row and each column having an address associated therewith, said electron beam tracing within one of the rows and across said columns of said matrix while scanning across the inner surface of said tube, a row address signal and a column address signal being developed corresponding to the address of the row and the column in which said electron beam is scanning, a certain number of scans of said electron beam are actually traced within each of said rows of said matrix, a horizontal sync signal being produced for each of said scans, comprising:

storing means for storing a plurality of values therein corresponding, respectively, to a plurality of intersections associated with the plurality of intersecting rows and columns of said matrix, said storing means generating a first output signal indicative of one of said values associated with one of said intersections and generating a second output signal indicative of another of said values associated with the next, adjacent, vertically oriented intersection relative to the one intersection in response to said row address signal and said column address signal;

converter means responsive to said first and said second output signal from said storing means for developing said convergence correction signal, said convergence correction signal having a signal parameter which changes linearly ranging from a first signal parameter corresponding to said first output signal from said storing means to a second signal parameter corresponding to said second output signal from said storing means, the degree of deflection of said electron beam being proportional to the linear change of said signal parameter associated with said convergence correction signal; and compensating means responsive to the certain number of said horizontal sync signals for each of said rows of said matrix for developing an output signal indicative of a particular number when the last of said certain number of scans is traced within each of the rows of said matrix, said particular number representing a desired number of scans to be traced by said electron beam within each of said rows of said matrix;

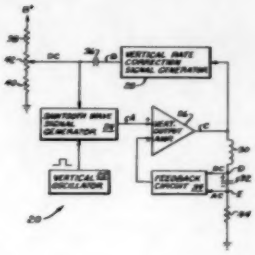
said converter means developing said convergence correction signal in response to said output signal from said compensating means and to the first and second output signals from said storing means.

4,422,020

VERTICAL IMAGE CORRECTION FOR PROJECTION TV

Stanley E. Lehnert, Addison, and Donald Ankeny, Schaumburg, both of Ill., assignors to Zenith Radio Corporation, Glenview, Ill.

Filed Jul. 21, 1982, Ser. No. 400,329
Int. Cl.³ H01J 29/56
U.S. Cl. 315—371 5 Claims



1. In a projection television having a projecting screen and at least one cathode ray tube for producing and projecting onto said projecting screen a video image representing a received video signal, wherein said projecting screen is obliquely disposed in the vertical direction relative to the image projection axis of at least said one cathode ray tube, a vertical deflection system for correcting for projected video image vertical distortion comprising:

an oscillator responsive to said received video signal and synchronized therewith for producing a pulsed output signal in timed relation with said received video signal;

circuit means coupled to said oscillator and responsive to said pulsed output signal for generating a substantially linear, sawtooth-shaped output voltage;

a vertical output circuit coupled to said circuit means and responsive to the sawtooth-shaped output voltage therefrom for generating an amplified sawtooth-shaped output current and a pulsed output voltage in timed relation with said received video signal;

a deflection coil coupled to said vertical output circuit and responsive to the output current therefrom for vertically deflecting an electron beam in at least said one cathode ray tube; and

vertical rate correction means coupled to said circuit means and said vertical output circuit and responsive to the pulsed output voltage therefrom for decreasing the vertical deflection rate over that portion of said projecting screen where said video image is vertically stretched and increasing the vertical deflection rate over that portion of said projecting screen where said video image is vertically compressed in correcting for the vertical distortion of said video image on said projecting screen.

4,422,021

ELECTRIC MOTOR DYNAMIC BRAKING ENERGY RECUPERATING SYSTEM

Albrecht Schwarz, Gerlingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Nov. 5, 1981, Ser. No. 318,458
Claims priority, application Fed. Rep. of Germany, Dec. 24, 1980, 3048999
Int. Cl.³ H02P 3/14
U.S. Cl. 318—376 8 Claims

1. Energy recuperating system to return energy from a series

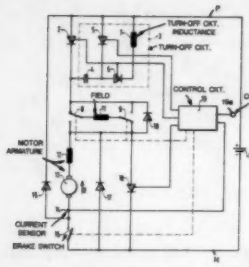
dynamo electric machine (11, 12, 13) to an energy storage battery (1) upon dynamic braking operation of the dynamo electric machine,

said dynamo electric machine having a series circuit including a field winding (11) and an armature (12, 13);

said system further including a chopper switch (2) connected in series between the storage battery (1) and said dynamo electric machine;

a control circuit (3, 19) connected to and controlling the duty cycle of the chopper switch (2) to control the average current flow to the dynamo electric machine;

a field polarity reversal switch (8, 9) connecting, selectively, the field winding in, respectively, reverse directions, with respect to current flow through the armature;



and a reverse current diode (15) connected across the series circuit formed by the field winding (11) and the armature (12, 13),

and comprising, in accordance with the invention,

a field diode (10) connected across the field winding (11);

and a controlled switch (18) connected to the junction between the field winding (11) and the armature, and to a return line (N) to the storage battery,

closing of said controlled switch (18) being controlled by said control circuit (19) when the motor is operating under dynamic braking conditions and to return energy to the storage battery.

4,422,022

SPEED CONTROL FOR TRUCK

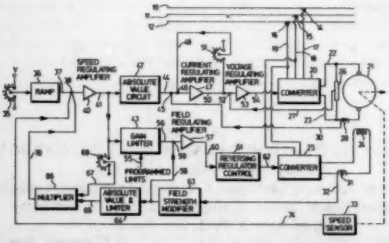
Walter A. Hill; Andrew C. Stevenson, and Peter G. McKenna, all of Peterborough, Canada, assignors to Canadian General Electric Company Limited, Toronto, Canada

Filed May 10, 1982, Ser. No. 376,288

Claims priority, application Canada, May 29, 1981, 378638

Int. Cl.³ H02P *3/14*

U.S. Cl. 318—376 **8 Claims**



1. A motor control for a direct current motor having an armature and a field winding, and hving a power source for providing armature current and for providing field current, said motor being operable in a motoring and in a regenerative braking state with field reversal in the braking state, comprising

means for providing a first control signal representing the difference between an input speed reference signal and an actual motor speed signal,

means for deriving a signal representing actual field current,

means for converting said signal representing field current into a signal representing field strength,

means for modifying said first control signal by summing it with a compensating signal derived from a product of a limited value of said signal representing field strength and a predetermined fraction of said first signal to provide torque compensation, and

means responsive to said modified first signal for controlling armature current and field strength.

4,422,023

STARTING CIRCUIT FOR ELECTRONICALLY CONTROLLED MOTOR APPARATUS

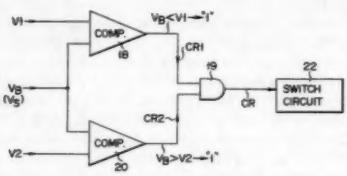
Teruo Iwasawa, Mitaka, and Hitomi Tojiki, Hachioji, both of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jul. 10, 1981, Ser. No. 281,949

Claims priority, application Japan, Jul. 17, 1980, 55-100975[U]

Int. Cl.³ H02P *5/16*

U.S. Cl. 318—384 **14 Claims**



1. A starting circuit for a motor apparatus including an integration capacitor which stores electrical charge corresponding to the operational state of said motor apparatus, said starting circuit comprising:

a source of power supply for supplying said motor apparatus with a power supply voltage:

comparison means having first and second given voltages and coupled to said source of power supply, for comparing a specific voltage corresponding to said power supply voltage with said first and second given voltages; and

discharge means coupled to said comparison means and to said integration capacitor of said motor apparatus, for discharging the electrical charge stored in said integration capacitor when said specific voltage has a level between said first and second given voltages.

4,422,024

WIPER CONTROL DEVICE FOR VEHICLE

Hajime Itoh, Aichi, and Yoshiyuki Igarashi, Nagoya, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Jan. 7, 1982, Ser. No. 337,715

Claims priority, application Japan, Sep. 3, 1981, 56-139198

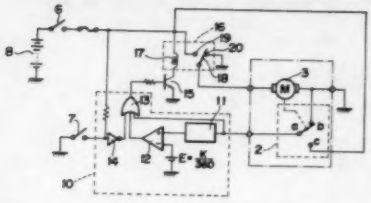
Int. Cl.³ H02P *3/10*

U.S. Cl. 318—443 **3 Claims**

1. A wiper control device for use with a vehicle for automatically stopping a wiper motor at a lowermost position of its wiping range when a wiper switch is turned OFF at an arbitrary time, wherein said motor synchronously rotates a cam plate formed with an annular electrode of a predetermined pattern on the surface thereof and has a plurality of cam contacts selectively isolated from or contacted with said annular electrode at predetermined angular positions in accordance

with the revolution of said wiper motor, said device comprising:

control circuit means for obtaining from the rotating speed of said wiper motor a sliding angle corresponding to the rotating speed of said wiper motor and causing an electric



current to flow continuously in said wiper motor before and even after said wiper motor is interrupted by selectively isolating a said cam contact from said annular electrode,

wherein the sliding angle of said wiper motor is obtained by

$$T_2 = \frac{\theta_2}{360 - \theta_0} \cdot T_1 - \frac{k}{360}$$

wherein T_1 represents the time in which said cam contacts are shortcircuited with said annular electrode, T_2 represents the time required that said wiper motor passes the sliding angle, k is a constant of proportion, θ_0 represents the rotating angle of said cam plate during the time T_1, and θ_2 represents the arbitrary sliding angle of said wiper motor stopped from a predetermined rotating speed as required during the time T_2.

4,422,025

CONTROL CIRCUIT

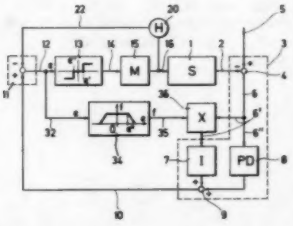
Manfred Steller, Wiesendangen, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Oct. 2, 1981, Ser. No. 308,106

Claims priority, application Switzerland, Oct. 7, 1980, 7467/80

Int. Cl.³ G05B *11/36*

U.S. Cl. 318—609 **4 Claims**



1. A control circuit for a plant comprising

a controller having an input for receiving a first signal from the plant representative of a controlled magnitude in the plant, an I-member for generating a second signal corresponding to an integrated value of the first signal and an output for emitting a third signal corresponding to said second signal;

a comparator having a first input connected to said output of said controller to receive said third signal, a second input to receive a fourth signal and an output for emitting a fifth signal representative of a difference between said third and fourth signals;

a servo-motor having a limited rate of adjustment, an input connected to said comparator output to receive said fifth signal and an output for delivering a control signal for controlling the controlled magnitude in the plant;

a pick-off connected to and between said output of said servo-motor and said second input of said comparator to generate a follow-up signal indicative of said control signal and to deliver said follow-up signal as said fourth signal to said second input of said comparator; and

an attenuating means connected to and between said comparator output and said I-member to attenuate said first signal being delivered to said I-member.

4,422,026

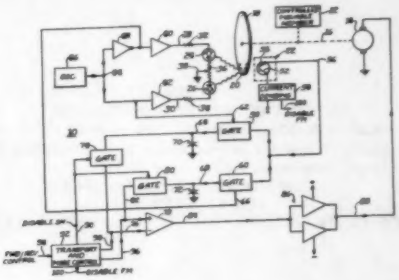
SERVO CONTROL ARRANGEMENT UTILIZING ALTERNATELY ENERGIZED LIGHT SOURCES AND A SINGLE PHOTODETECTOR

Rudolph Starai, Arlington Heights, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Dec. 31, 1981, Ser. No. 336,469

Int. Cl.³ G05B *1/06*

U.S. Cl. 318—640 **16 Claims**



1. A servo control arrangement for controlling the accurate positioning of a movable controlled member to each of a predetermined plurality of controlled positions, the servo control arrangement comprising:

means responsive to a drive input signal for moving the controlled member to said plurality of controlled positions;

coded array means arranged for movement in a manner directly correlated to movement of the controlled member, said coded array means comprising an array of energy transmissive members arranged in a predetermined pattern, one of said energy transmissive members being disposed in said predetermined pattern corresponding to each of the predetermined plurality of controlled positions, movement of said coded array means resulting in said coded array describing a predetermined path, movement of said coded array means sequentially presenting each of said energy transmissive members in said predetermined pattern to a predetermined detection station;

energy generating means comprising two energy generation sources and means for alternately energizing each of said two energy generation sources at a predetermined rate, said two energy generation sources being disposed at said detection station on one side of said coded array means, said two energy generation sources being arranged side by side along said predetermined path and substantially centered about said detection station;

energy detection means responsive to said energy generation sources for generating an output signal representative of the relative level of energy received, said energy detection means being disposed at said detection station on the side of said coded array means opposite said energy generation sources and generally aligned with a line substantially per-

pendicular to said planar array and passing through the midpoint of said two energy generation sources such that energy generated by said energy generation sources is received by said energy detection means through one of said energy transmissive members when said energy transmissive member is within a predetermined positional range of said aligned detection position, the relative amount of energy received by said energy detection means from each of said energy generative sources being dependent on the position of said energy transmission member within said predetermined positional range;

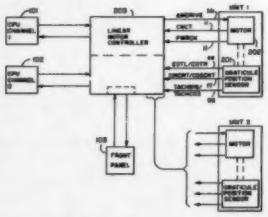
control means responsive to said output signal of said energy detection means for controlling operation of said moving means and generating said drive input signal in accordance with the relative difference in the output of said energy detection means occurring between the respective energization times of said alternately energized sources and corresponding to the relative difference in energy received from each of said energy generative sources.

4,422,027

LINEAR MOTOR CONTROLLER

Richard D. Mohlere, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 16, 1981, Ser. No. 244,438
Int. Cl.³ G05B *11/00*
U.S. Cl. 318—687 1 Claim



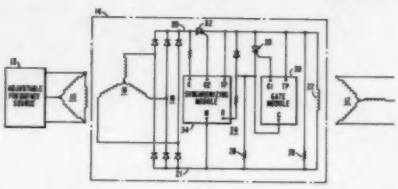
1. A motor controller device comprising a motor to be controlled; a position sensor associated with said motor such that the sensor will generate at its outputs, signals indicating the position and travel of said motor; a linear motor controller connected to drive said motor and connected to receive the signals from said position sensor; said linear motor controller having a plurality of registers which may be loaded with predetermined values so as to control various motions and rates of said motor; a panel control device having a plurality of data input switches which are connected to said registers for selectively inputting said predetermined value into selective ones of said registers for controlling movement of said motor; a second motor, a second position sensor associated with said second motor for indicating position and movement of said second motor; said second motor and said second position sensor being connected to said linear motor controller; further switching means on said panel control device for selecting which motor is to be controlled; first and second computer inputting devices; and additional switching means on said panel control device for selectively connecting the plurality of registers to one of said computer inputting devices or to said panel control device.

4,422,028

BRUSHLESS EXCITATION SYSTEM WITH A HOLDING CURRENT RESISTOR

Gurney L. Godwin, and Alvin M. Vance, both of Georgetown, Tex., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 12, 1981, Ser. No. 262,737
Int. Cl.³ H02P *5/40*
U.S. Cl. 318—718 8 Claims



1. A brushless excitation system for a synchronous dynamoelectric machine comprising:

a stationary exciter field winding;

a rotor assembly including:

an exciter armature winding inductively coupled to the exciter field winding,

a rectifier connected to the exciter armature winding,

a synchronous dynamoelectric machine field winding connected in circuit with said rectifer, and

an excitation control system for controlling the application of excitation current from said rectifier to said field winding, said control system including in part a semiconductor switch requiring a minimum holding current for reliable turn-on in response to a predetermined gating signal, and

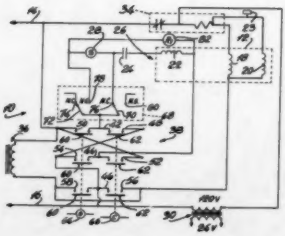
a holding current resistor connected across said field winding for insuring conduction of sufficient holding current to reliably turn on said semiconductor switch.

4,422,029

INSTANT REVERSE CONTROL CIRCUIT FOR A SINGLE PHASE MOTOR

J. T. Maurice Demers, and Peter G. Stefanatos, both of Quebec, Canada, assignors to Doorlec Corporation/Corporation Doorlec, Montreal, Canada

Filed May 19, 1982, Ser. No. 379,921
Claims priority, application Canada, May 28, 1981, 378548
Int. Cl.³ H02P *1/44*
U.S. Cl. 318—753 7 Claims



1. In a control circuit for a single phase AC motor having a running winding, a starting circuit comprising a start winding and a phase shift device connected in series, and a switch means for deenergizing the starting circuit when the motor is running, the motor being capable of operating in either direction, the improvement comprising:

reversing switch means for reversing the current direction

through the start windings, said reversing switch means comprising a remotely operable double-pole, double-throw reversing switch having a set of first contacts, a set of second contacts, a set of common contacts, and two movable contact members for selectively, electrically connecting each of said common contacts with corresponding ones of said first and second contacts, a first one of said common contacts being connected at all times to one end of the starting circuit, corresponding ends of the starting circuit; and

switch means for bypassing the deenergizing switch means comprising a first contact connected to one end of the starting circuit and a second contact connected at all times to a second one of said reversing switch common contacts such that the starting circuit can be energized while the motor is running in the opposite direction thereby rapidly decelerating the motor.

4,422,030

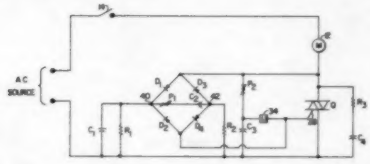
A.C. MOTOR CONTROL

Raymond J. McAllise, 1812 Bruce St., Canal Fulton, Ohio 44614

Continuation-in-part of Ser. No. 178,499, Aug. 15, 1980, abandoned. This application Sep. 11, 1981, Ser. No. 301,423

Int. Cl.³ H02P 1/18

U.S. Cl. 318—779 **43 Claims**



1. A motor control in combination with a motor and a source of substantially constant frequency and substantially constant voltage A.C. power, said motor control comprising terminals connecting it in circuit with said motor and with said source of A.C. power, a main switching means switchable between ON and OFF conditions, and control means responsive to the switching of said main switching means from its OFF to its ON condition and operable while said A.C. source remains at its substantially constant frequency and its substantially constant voltage for first feeding power from said source to said motor at a high average voltage during a starting period of some duration and for automatically thereafter feeding power from said source to said motor at a lower average voltage of fixed value which is maintained for so long as said main switching means remains in its ON condition, said high average voltage at least at the very beginning of said starting period being equal to the average value of the voltage of said source.

4,422,031

METHOD AND DEVICE FOR CHARGING AN ELECTRICAL ACCUMULATOR BATTERY BY MEANS OF SOLAR-CELLS

Ole K. Vigerstol, Turramurra, Australia, assignor to SAB Nife AB, Landskrona, Sweden

PCT No. PCT/SE81/00376, § 371 Date Aug. 12, 1982, § 102(e) Date Aug. 12, 1982, PCT Pub. No. WO82/02121, PCT Pub. Date Jun. 24, 1982

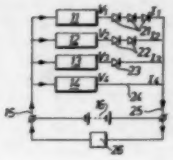
PCT Filed Dec. 16, 1981, Ser. No. 413,344

Claims priority, application Sweden, Dec. 17, 1980, 8008899O

Int. Cl.³ H02J 7/00

U.S. Cl. 320—2 **3 Claims**

1. A device for charging an electrical accumulator battery by means of solar panels containing solar-cells characterised by a plurality of charging branches connected in parallel, each comprising at least one solar-cell panel, which charging branches contain solar-cell panels of substantially the same power, and in which branches at least one diode is respectively connected in series between at least some of the solar panels and the battery to constitute the sole switching means for disconnecting the solar panels in the respective branches automatically in response to variations in battery voltage, the charging branches being adapted to deliver charging current at different voltages with at least one voltage from one of the panels by means of the diodes being higher than the others.



4,422,032

BATTERY CHARGING CIRCUIT FOR MAINTAINING A SUBSTANTIALLY CONSTANT AVERAGE VALUE OF CHARGING CURRENT DESPITE VARIATIONS IN CHARGING VOLTAGE

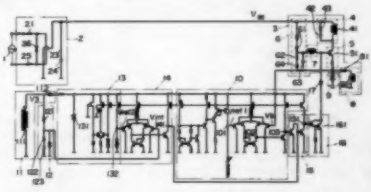
Hiromi Kakumoto, and Kaoru Furukawa, both of Hikone, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed Feb. 3, 1981, Ser. No. 231,006

Claims priority, application Japan, Feb. 14, 1980, 55-16842

Int. Cl.³ H02J 7/10

U.S. Cl. 320—39 **6 Claims**



1. A charging apparatus for a rechargeable battery, comprising:

an alternating current voltage source for supplying an A.C. input voltage;

rectifying means for converting said A.C. input voltage to a D.C. input voltage;

inverter means receiving the D.C. input voltage from said rectifying means,

said inverter means including,

an oscillating transformer having a primary winding,

a secondary winding and a feedback winding,

a semiconductor switch means inserted in a current path of said primary winding, and

means receiving the D.C. input voltage from said rectifying means for providing an on signal to said semiconductor switch means through said feedback winding,

said primary winding receiving the output from said rectifying means, said secondary winding being connected to a rechargeable battery through a rectifying element,

a fourth winding coupled to said oscillating transformer;

means for rectifying the voltage obtained from said fourth winding in synchronism with an oscillating period of said inverter means for generating a source voltage; and

control means responsive to said source voltage, said control means including,

voltage comparing means receiving at one input thereof a predetermined reference voltage,

means for supplying a comparison voltage associated with said source voltage to the other input of said voltage comparing means,

said voltage comparing means providing an output if and when said comparison exceeds said reference voltage,

means responsive to the output from said voltage comparing means for forcedly turning said semiconductor switch means off,

the on time period of said semiconductor switch means being approximately reversely proportional to the magnitude of said D.C. input voltage, whereby the charging current of the rechargeable battery coupled to said secondary winding is maintained approximately constant.

4,422,033

TEMPERATURE-STABILIZED VOLTAGE SOURCE

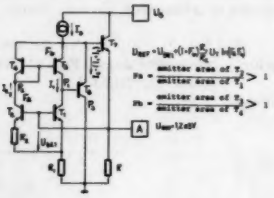
Willy Minner, Schwaigern; Rolf Böhme, Bad Friedrichshall; Martin Siegle, Weinstadt, and Heinz Rinderle, Heilbronn, all of Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs-GmbH, Frankfurt, Fed. Rep. of Germany

Filed Dec. 15, 1981, Ser. No. 330,811

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1980, 3047685

Int. Cl.³ G05F *3/08, 1/58*

U.S. Cl. 323—314 **10 Claims**



1. A temperature-stabilized voltage supply circuit comprising first and second parallel-connected circuit branches, first and second pairs of interconnected transistors, one transistor from each pair lying in each circuit branch, electrical supply means connected to said current branches, a third circuit branch connected in parallel to said first and second circuit branches, and circuit output means for the temperature-stabilized voltage wherein the active transistor areas of the transistors within each of said pairs are different.

4,422,034

METHOD FOR MEASURING INSULATION RESISTANCE AND DEVICE THEREFOR

Tatsuji Matsuno, Kawasaki, and Yosio Nomura, Fujisawa, both of Japan, assignors to Toyo Sushinki Kabushiki Kaisha, Kanagawa, Japan

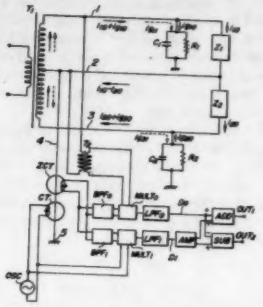
Filed Jan. 19, 1981, Ser. No. 226,620

Claims priority, application Japan, Jan. 22, 1980, 55-6207; Mar. 27, 1980, 55-39926; Apr. 9, 1980, 55-47324

Int. Cl.³ G01R *31/02*

U.S. Cl. 324—51 **9 Claims**

1. A method for the measuring insulation resistance of a grounded supply line, in which one end of a secondary circuit, to which a main frequency f_0 is fed, is grounded via a ground wire, comprising the steps of applying a low voltage of a frequency f_1, different from the main frequency f_0, into the ground wire through a transformer coupled thereto, detecting separately the leakage current of the frequency f_0 and the leakage current of the frequency f_1, both said current leakages being included in the output of a zero phase transformer coupled with said ground wire, obtaining a component of the leakage current of the frequency f_0 and a component of the leakage current of the frequency f_1, and deriving an amount in inverse proporytion to the insulation resistance of each non-



grounded line by using an arithmetic operation of said components while the line is in active condition.

4,422,035

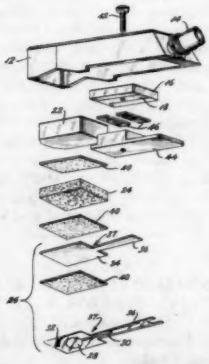
CAPACITANCE MEASUREMENT PROBE

Donald G. Risko, Monroeville, Pa., assignor to Extrude Hone Corporation, Irwin, Pa.

Filed Dec. 11, 1981, Ser. No. 329,943

Int. Cl.³ G01R *27/26*

U.S. Cl. 324—61 P **29 Claims**



1. In a probe for use in capacitive gauging of the texture of a conductive surface, said probe having a casing and attached elastomer pad backing for a capacitive type sensor, an active sensor area electrically insulated from said casing, and a dielectric attached to said sensor to space said active sensor area from said surface, the improvement comprising:

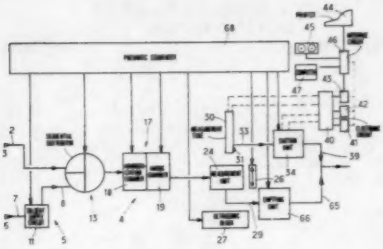
a flexible coating of conductive material on said dielectric, said coating having a configuration to form said active sensor area and an integral conductive lead for connection of said sensor area to an electronic instrumentation package.

4,422,036

APPARATUS FOR CONTINUOUSLY MEASURING CELLS OR PARTICLES IN SUSPENSION IN A LIQUID MEDIUM

Manfred Moll, Allee Chaptal, Richardmenil, 54630 Flavigny S/Moselle; Jean J. Delorme, 47 bld Albert ler, 54000 Nancy, and Jean C. Weber, 16 rue du Portugal, 54500 Vandoeuvre, all of France

Continuation of Ser. No. 835,788, Sep. 22, 1977, abandoned. This application Dec. 31, 1979, Ser. No. 108,571
Claims priority, application France, Aug. 31, 1977, 77 27155
Int. Cl.³ G01N *27/00*
U.S. Cl. 324—71.4 4 Claims



1. An automatic apparatus for sampling and preparing a sample of a liquid medium during the course of fermentation of the liquid medium and for determining the number of cells or particles in suspension in the liquid medium, said apparatus comprising:

sampling means for sampling a liquid medium;

dilution means for diluting the sample of liquid medium;

measuring means for measuring the number of cells or particles in the diluted sample of liquid medium;

said measuring means comprising a measurement receptacle for containing the diluted sample of liquid medium and being positionable at a raised measurement position and a lowered treatment position, ultrasonic applicator means for applying ultrasonic energy to the diluted sample of liquid medium within said measurement receptacle when said measurement receptacle is in the lowered treatment position, a measurement electrode positioned for measuring the number of cells or particles in suspension in the diluted sample of liquid medium within said measurement receptacle when said measurement receptacle is in the raised measurement position; and

sequential actuating means for automatically sequentially actuating said sampling means, said dilution means and said measuring means to sequentially sample, dilute, treat with ultrasonic energy and measure the liquid medium.

4,422,037

STORM WARNING METHOD AND APPARATUS

Ernest W. Coleman, 1465 Sinkler Rd., Warminster, Pa. 18974

Filed Feb. 17, 1981, Ser. No. 235,168
Int. Cl.³ G01N *31/02*
U.S. Cl. 324—72 25 Claims

1. An apparatus for determining the location of lightning strokes, each lightning stroke generating electric (E) and magnetic (H) field components, said apparatus comprising:

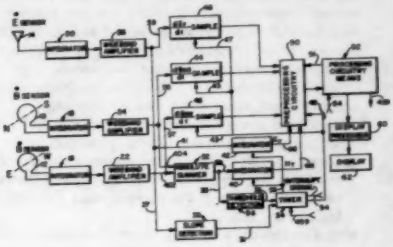
receiving means for receiving separately the electric (E) and magnetic (H) field components of a lightning stroke and for generating electrical signals associated with said E and H field components;

recognition circuitry means connected to said receiving means for indicating when said E and H field components of a lightning stroke have been received by said receiving means;

control circuitry means connected to said recognition circuitry means for providing control signals to said apparatus when said recognition circuitry means indicates that said E and H field components of a lightning stroke have been received by said receiving means;

integration circuitry means connected to said receiving means and said control circuitry means for integrating separately over a predetermined time interval said electrical signals associated with said E field and said electrical signals associated with said H field, said integration occurring in response to at least a selected one of said control signals;

sampling circuitry means connected to said receiving means



and said control circuitry means for sampling said electrical signals in response to a plurality of second ones of said control signals; and

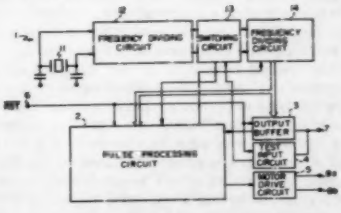
processing circuitry means disposed to receive said integrated and sampled electrical signals in response to a third one of said control signals, said processing circuitry means for determining the direction to said lightning stroke relative to said apparatus from said sampled electrical signals, and for determining the distance to said lightning stroke from said apparatus from said integrated or sampled electrical signals.

4,422,038

INTEGRATED CIRCUIT WITH FREQUENCY-DIVIDING CIRCUITS CAPABLE OF BEING TESTED AT A HIGH SPEED

Hideo Monma, Kawasaki; Masayuki Takahashi, Utsunomiya, and Masato Ishiguro, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

PCT No. PCT/JP80/00138, § 371 Date Feb. 18, 1981, § 102(e) Date Feb. 18, 1981, PCT Pub. No. WO80/02880, PCT Pub. Date Dec. 24, 1980
PCT Filed Jun. 19, 1980, Ser. No. 237,152
Claims priority, application Japan, Jun. 19, 1979, 54-77169
Int. Cl.³ G01R *31/28, 23/00*; G04C *3/00*
U.S. Cl. 324—73 R 7 Claims



1. An improved integrated circuit of the type which has a plurality of pins and which includes a frequency-dividing circuit for dividing an input signal, a pulse processing circuit for processing the signal that is divided by said frequency-dividing circuit to produce processed pulses, an output circuit

for feeding the processed pulses through at least one first pin to a load, said pulse processing circuit including a reset signal receiving circuit, for discontinuing the transfer of processed pulses to the load following receipt of a reset signal applied to a second pin, and an output buffer circuit connected between said frequency-dividing circuit and a third pin, wherein the improvement comprises:

testing means responsive to a test signal applied to said third pin while said reset signal is applied to said second pin for introducing said test signal at an intermediate point in said frequency-dividing circuit, said intermediate point dividing said frequency-dividing circuit into first stage and second stage frequency-dividing circuits, and for permitting transfer of processed pulses to said at least one first pin despite the presence of said reset signal at said second pin, in order to permit testing of said second stage frequency-dividing circuit, said pulse processing circuit, and said output circuit, said testing means including

a switching circuit inserted between the first stage and second stage frequency-dividing circuits;

test input circuit means having an input connected to said third pin for supplyiing said test signals through said switching circuit to the second stage frequency-dividing circuit; and

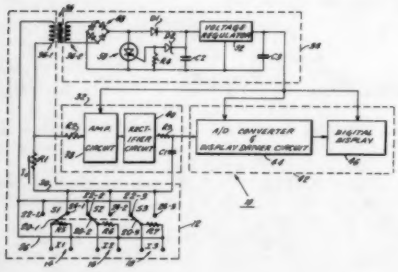
means included within said output buffer circuit for isolating said output buffer circuit from said third pin when a reset signal is fed through said second pin to said reset signal receiving circuit.

4,422,039

SELF-POWERED AMMETER

Lee A. Davis, Audubon, N.J., assignor to Brown Boveri Electric Inc., Rolling Meadows, Ill.

Filed Apr. 24, 1981, Ser. No. 256,998
Int. Cl.³ G01R *19/22, 1/20*
U.S. Cl. 324—119 **5 Claims**



1. A self-powered ammeter for providing a visual indication of the magnitude of an a-c current; said ammeter comprising:

a metering circuit for generating a first d-c voltage signal indicative of the magnitude of said a-c current;

a display circuit connected to said metering circuit and responsive to said first d-c voltage signal for providing a visual indication of the magnitude of said a-c current; and

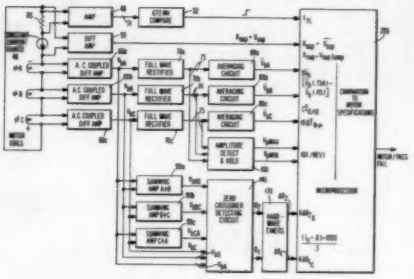
a power supply circuit including a current transformer having a primary winding which conducts said a-c current, and a secondary winding connected to burden circuit means; said burden circuit means having a d-c power supply output having a regulated magnitude and means for applying said power supply output to power supply inputs of both said metering circuit and said display circuit for powering the same; said burden circuit means comprising rectifier means connected to said secondary winding and voltage regulator means connected to the output of said rectifier means; said burden circuit means further including a capacitor and means for charging said capacitor to a predetermined level and for maintaining the charge on said capacitor substantially at said predetermined level; said charging means comprising a first diode for permitting charging current to flow into said capacitor but preventing discharge current to flow and thyristor means for permitting charging current to flow into said capacitor only when the charge across said capacitor is below a predetermined value.

4,422,040

METHOD OF TESTING STEPPING MOTORS

Jerry W. Raider, and Earl D. Ward, II, both of Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 5, 1981, Ser. No. 318,492
Int. Cl.³ G05B *19/40*
U.S. Cl. 324—158 MG **29 Claims**



1. A method of testing a stepping motor having a stator with a plurality of phases and a rotor, comprising the steps of:

connecting the phases of the motor under test in series;

applying a constant current to said phases;

rotating said rotor of said motor at a constant speed;

detecting a voltage drop across at least one phase and converting said detected voltage drop into back EMF for said at least one phase;

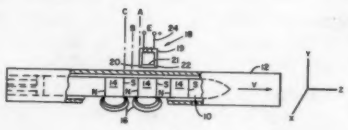
analyzing the back EMF of at least said one phase to determine a parameter of said motor.

4,422,041

MAGNET POSITION SENSING SYSTEM

Jeffrey A. Lienau, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jul. 30, 1981, Ser. No. 288,595
Int. Cl.³ G01B *7/14*
U.S. Cl. 324—207 **4 Claims**



1. A magnetic position sensing circuit comprising: an object having a longitudinal axis and adapted for displacement substantially along said axis; magnetic means disposed selectively on said object for producing a plurality of magnetic fields, said magnetic means being a plurality of spaced apart magnetic field producing members disposed around the circumference of the object for radiating individual magnetic fields circumferentially outward from the object; sensing means disposed adjacent to said object for sensing magnetic field strength indicative of lateral and longitudinal position changes of said

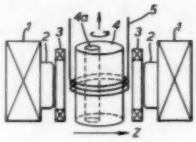
magnetic means relative to said sensing means, said sensing means being a plurality of sensor elements disposed in a plurality of parallel planes passing through the object and each element being disposed for sensing positional changes in the object; signal processing means for indicating the changes in lateral and longitudinal position between said sensing means and said magnetic means; and a centerline axis normal to said planes, said sensor elements being equidistant from said centerline.

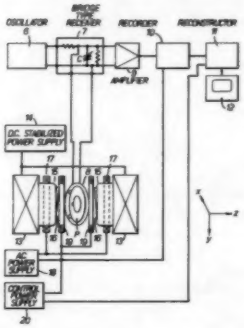
4,422,042

NUCLEAR RESONANCE APPARATUS INCLUDING MEANS FOR ROTATING A MAGNETIC FIELD

Hiroshi Sugimoto, Ootawara, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed May 19, 1981, Ser. No. 265,240
Claims priority, application Japan, Jun. 13, 1980, 55-79391
Int. Cl.³ G01R *33/08*
U.S. Cl. 324—313 **5 Claims**





1. A nuclear magnetic resonance apparatus for measuring the nuclear magnetic resonance of a specified atomic nucleus in a body, the apparatus comprising:

a magnet apparatus for generating a homogeneous static magnetic field between its magnetic poles;

shim means composes of a magnetic substance mounted on said magnetic poles for applying a first gradient magnetic field intensity distribution in a direction orthogonal to the direction of the line of magnetic force of the static magnetic field;

gradient magnetic field generating electromagnetic apparatus for generating a second gradient magnetic field having a gradient magnetic field intensity distribution as to the direction along said line of magnetic force in superimposition with the static magnetic field for varying the magnetic field gradient of said first gradient magnetic field;

an oscillator for generating an oscillating output having a frequency corresponding to the nuclear magnetic resonance condition of the atomic nucleus to be measured;

a coil wound around the body to be examined for applying the output of said oscillator as electromagnetic waves upon the body;

a receiver for detecting the nuclear magnetic resonance signal received by the coil;

a gradient magnetic field controller making a magnetic field line equivalent to the gradient magnetic field defined as the combination of the first gradient magnetic field generated by said magnet apparatus, as acted on by said shims, and the second gradient magnetic field generated by said electromagnetic apparatus, and for rotating the line along the section of the body to be examined by controlling said electromagnetic apparatus;

a recorder for recording the nuclear magnetic resonance signal intensity detected by the receiver as to a plurality of directions of equivalent magnetic fields due to said gradient magnetic field controller in a manner to correspond to the position as to the direction perpendicular to said equivalent magnetic field line;

a reconstructor for reconstructing the concentration distribution of the specific atomic nuclei in the section of the body on the basis of the nuclear magnetic resonance signal intensity as to a plurality of directions recorded in the recorder;

and

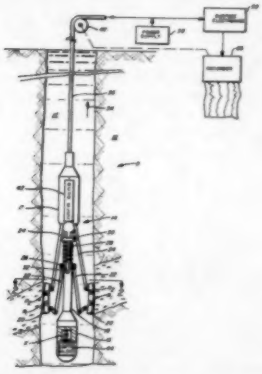
a display unit for depicting the result of the reconstruction by said reconstructor.

4,422,043

ELECTROMAGNETIC WAVE LOGGING DIPMETER

Richard A. Meador, Spring, Tex., assignor to Texaco Development Corporation, White Plains, N.Y.

Filed Mar. 16, 1981, Ser. No. 244,391
Int. Cl.³ G01V *3/30*
U.S. Cl. 324—338 **12 Claims**



1. A radio frequency well logging dipmeter for determining dip of subsurface formations adjacent a well borehole, comprising:

(a) a sonde for movement in the well borehole;

(b) transmitter means in said sonde for emitting radio frequency electromagnetic waves at a frequency in a preferred range of two megahertz to one hundred megahertz;

(c) at least three pads mounted with said sonde for contacting subsurface formation walls at selected depths in the well borehole;

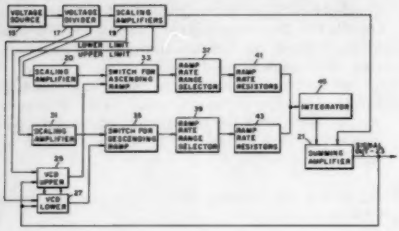
(d) a plurality of radio frequency sensor coils mounted in a manner so that a common axis of the sensor coils is substantially parallel to the longitudinal axis of the well borehole when in use on each of said pads for sensing the water emitted from said transmitter means;

(e) electronic circuit means for forming a measure of the phase difference between the waves sensed by said sensor coils for each one of said pads to form an indication of the dip of the well borehole.

4,422,044
HIGH PRECISION TRIANGULAR WAVEFORM GENERATOR

Theodore R. Mueller, Oak Ridge, Tenn., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Nov. 17, 1981, Ser. No. 322,145
Int. Cl.³ H03K 4/10, 4/84
U.S. Cl. 328—181 4 Claims



1. A triangular waveform generator, comprising:

a current integrator having an input and an output;

a first constant-current-generating means connected to the input of said integrator for generating and applying a first constant current to said input of said integrator corresponding to a selectable positive-going ramp rate for the triangular waveform at the output of said integrator in response to a first selectable scaled voltage applied to an input thereof,

a second constant-current-generating means connected to the input of said integrator for generating and applying a second constant current following said first constant current to said input of said integrator corresponding to a selectable negative-going ramp rate for said triangular waveform at the output of said integrator in response to a second scaled voltage applied to said input;

means for generating said first and second selectable scaled voltages;

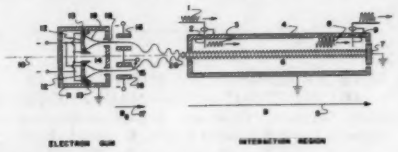
means for generating first and second selectable reference voltages corresponding to the desired upper and lower voltage limits, respectively, of said triangular waveform; and

switching means for alternately applying said first and second scaled voltages to said first and second constant-current-generating means, respectively, including first and second gated rectifier circuits each having an input connected to receive said first and second scaled voltages, respectively, and generating and continuously applying either a zero volt signal or the corresponding scaled voltage signal to said first and second current generating means, respectively, when gated "off" or "on" in response to first and second gate control signals applied to respective gate control inputs thereof; and first and second voltage crossing detector means each having inputs coupled to receive the output signal of said integrator and said first and second reference voltages, respectively, for generating said first and second gate control signals so that said first gated rectifier circuit is gated on and said second gated rectifier circuit is gated off until the amplitude of the positive going portion of the output signal of said integrator crosses said first refcrence signal level and alternately said first gated rectifier circuit is gated off and said second gated rectifier circuit is gated on until the amplitude of the negative-going portion of the output signal of said integrator crosses said second reference signal level.

4,422,045
BARNETRON MICROWAVE AMPLIFIERS AND OSCILLATORS

Larry R. Barnett, 8221 Erika Dr., Manassas, Va. 22111

Filed Mar. 20, 1981, Ser. No. 245,759
Int. Cl.³ H01S 1/00; H01J 23/16
U.S. Cl. 330—4 6 Claims

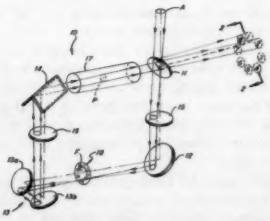


1. An amplifying maser device utilizing a spatially nonlinear electrostatic field to induce stimulated cyclotron emission of radiation by electrons which comprises; a fast-wave propagating electromagnetic waveguide to support the wave, an input and output coupling means, a means of producing a magnetic field in the said waveguide, a means of injecting electrons with components of velocity parallel and perpendicular to the said magnetic field wherein the spatial distribution of the electrons produces the spatially nonlinear electrostatic field where the said spatially nonlinear electrostatic field is defined to be an electric field which is described as: the magnitude of the said electric field having a nonlinear variation as a function of position in one or more directions and serves to cause an electron moving in cyclotron orbits, in said magnetic field and said electric field, to have its cyclotron orbit to be modified and the cyclotron resonance frequency to be modified where the said resonance frequency is a function of the magnitude of the said orbit.

4,422,046
AXISYMMETRIC SPATIAL/TEMPORAL ENCODER

Peter B. Mumola, Huntington; Paul R. Yoder, Jr., Wilton; Raul E. Casas, Danbury, and William M. Grossman, Ridgefield, all of Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Jun. 23, 1980, Ser. No. 162,213
Int. Cl.³ H01S 3/05
U.S. Cl. 330—4.3 19 Claims



1. An optical ring for continuously circulating a beam around its periphery, comprising in combination;

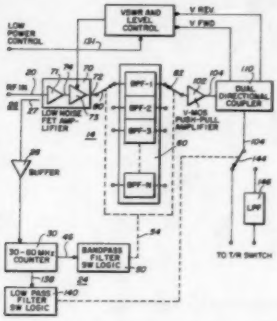
first means for receiving a collimated beam into said ring at a predetermined angle relative to the optical axis of the ring;

second means comprising an out-of-plane mirror assembly for causing said beam to turn in azimuth about the optical axis.

4,422,047
SOLID STATE AUTOTUNE POWER AMPLIFIER

William A. Wright, Fairfax Station, Va., assignor to E-Systems, Inc., Dallas, Tex.

Filed Nov. 23, 1981, Ser. No. 324,223
Int. Cl.³ H03F 3/191; H03G 3/30; H04B 1/04
U.S. Cl. 330—51 10 Claims



1. A method of automatically tuning an R.F. power amplifier to the R.F. signal generated in a multichannel radio transmitter and applied to the input of the R.F. power amplifier so as to provide equal response across all transmission channels of the radio transmitter, comprising the steps of:

(a) determining the frequency of the R.F. signal;

(b) automatically selecting one of a plurality of band pass filters (BPF) having separate band-pass characteristics which collectively cover the bandwidth of all channels of the radio transmitter, basing said selection on said frequency determination;

(c) passing the RF signal through said selected BPF for reducing broadband noise;

(d) amplifing said filtered RF signal to a preselected level;

(e) sampling said amplified and filtered RF signal; and

(f) controlling the magnitude of said amplified and filtered RF signal with said sample and in functional relation to said preselected level and a Voltage Standing Wave Ratio (VSWR) load of the RF power amplifier.

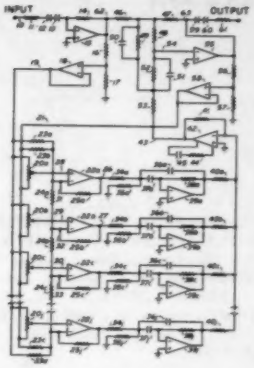
4,422,048
MULTIPLE BAND FREQUENCY RESPONSE CONTROLLER

Richard K. Edwards, 784 Austin Ave., Oradell, N.J. 07649

Continuation-in-part of Ser. No. 121,596, Feb. 14, 1980, abandoned. This application Jul. 23, 1982, Ser. No. 401,108
Int. Cl.³ H03F 1/34, 3/181
U.S. Cl. 330—109 22 Claims

20. A multiple band frequency response controller having a plurality of frequency control bands, each of which includes frequency band selective means in combination with a band response control, said band response controls being operatively controlled by control means, said control means comprising computing means characterized in that:

the control signals applied to said plurality of band response controls by said control means are determined by said computing means by the process comprising the step of multiplying the matrix representing the desired system response levels at the band center frequencies of said plurality of frequency control bands by a multiplier matrix which is substantially proportional to the matrix which is the inverse of the matrix representing the real response components of said frequency band selective means of each of said frequency control bands at the various center frequencies of said plurality of frequency band selective means, whereby system response at each of said band

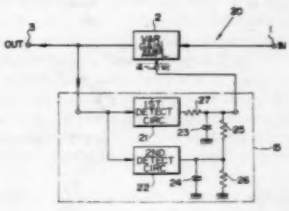


center frequencies is caused to substantially conform to said desired system response levels.

4,422,049
GAIN CONTROL CIRCUIT

Kenzo Akagiri, and Masayuki Katakura, both of Yokohama, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Mar. 23, 1981, Ser. No. 246,392
Claims priority, application Japan, Mar. 24, 1980, 55-37112
Int. Cl.³ H03G 7/00
U.S. Cl. 330—134 19 Claims



1. A gain control circuit including variable gain amplifier means having input, output and control terminals, and control means for generating a control signal applied to said control terminal for controlling the gain with which said variable gain amplifier means amplifies an input signal applied to said input terminal for providing an output signal to said output terminal, said control means comprising:

first and second detector means for detecting a signal passed through the amplifier means and providing respective first and second detector outputs representative of the level of said signal passed through the amplifier means;

first and second capacitors connected at one side to said first and second detector means so as to be chargeable by said first and second detector outputs, respectively;

said one side of said first capacitor being connected with said control terminal of the variable gain amplifier means so that the charge on said first capacitor constitutes said control signal;

a first resistor connected between said one sides of said first and second capacitors; and

a second resistor connected with said one side of said second capacitor for the discharge of said second capacitor through said second resistor and for the discharge of said first capacitor through said first and second resistors only

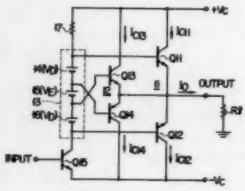
after substantial discharge of said second capacitor through said second resistor so that the discharge time constant of said first capacitor is varied in accordance with said second detector output.

4,422,050

SINGLE-ENDED PUSH-PULL AMPLIFIER WITH TWO COMPLEMENTARY PUSH-PULL CIRCUITS

Kenji Suzuki, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Jul. 1, 1981, Ser. No. 279,253
Claims priority, application Japan, Jul. 9, 1980, 55-93420
Int. Cl.³ H03F 3/26
U.S. Cl. 330—263 15 Claims



1. An audio amplifier comprising:

first and second complementary single-ended push-pull circuits connected in parallel across a power source and having their outputs connected together, said first push-pull circuit including first and second complementary transistors and said second push-pull circuit including third and fourth complementary transistors, said first and third transistors being in a positive side, and said second and fourth transistors being in a negative side, said output of said push-pull circuits being adapted to be coupled to a load;

an input coupled to said push-pull circuits for receiving an input signal; and

a bias circuit coupled to said first and second push-pull circuits for biasing said first to fourth transistors, such that:

idling currents are allowed to flow through said first and second transistors under a zero signal input condition;

said third and fourth transistors are both in a cut-off state when an input signal applied to said first and second push-pull circuits is small;

as said input signal increases in one direction, a current flowing through said first transistor continuously increases, and when said input signal reaches a predetermined magnitude in said one direction, said second transistor is rendered cut-off and said third transistor is rendered conductive, whereby a sum of currents flowing through said first and third transistors is derived as an output current of the amplifier; and

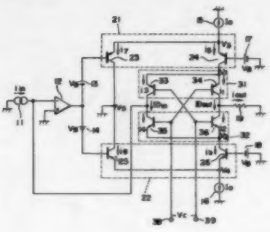
as said input signal increases in the other direction, a current flowing through said second transistor continuously increases; and when said input signal reaches a predetermined magnitude in said other direction, said first transistor is rendered cut-off and fourth transistor is rendered conductive, whereby a sum of currents flowing through said second and fourth transistors is derived as the output current of the amplifier.

4,422,051

GAIN CONTROL CIRCUIT

Masayuki Katakura, and Kenzo Akagiri, both of Yokohama, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jul. 23, 1981, Ser. No. 286,243
Claims priority, application Japan, Jul. 28, 1980, 55-103322; Jul. 28, 1980, 55-103323
Int. Cl.³ H03G 3/30; H03F 3/45
U.S. Cl. 330—278 17 Claims



1. A gain control circuit comprising

input means receiving an input signal;

first differential amplifier means having an input coupled to said input means and first and second differential output terminals;

second differential amplifier means having an input coupled to said input means and first and second differential output terminals;

a first pair of transistors of one conductivity type having emitters coupled together to the first differential output terminal of said first differential amplifier and also having respective bases and collectors;

a second pair of transistors having an opposite conductivity type in respect to said first pair, having emitters coupled together to the first differential output terminal of said second differential amplifier means, having respective collectors coupled so that the collector of one transistor of the first pair is coupled to the collector of one transistor of the second pair and the collector of the other transistor of the first pair is coupled to the collector of the other transistor of the second pair, and having respective bases coupled so that the base of the one transistor of each pair is coupled to the other transistor of the remaining pair;

feedback means coupling the collectors of said one transistors to said input means;

means coupling the second differential amplifier means to a common reference point;

output means coupled to the collectors of the other transistors of said first and second pairs; and

control input means coupled to apply a control voltage between the bases of the transistors of each of the first and second pairs thereof.

4,422,052

DELAY CIRCUIT EMPLOYING ACTIVE BANDPASS FILTER

Bernard J. Yorkanis, South Plainfield, and Walter E. Sepp, Princeton, both of N.J., assignors to RCA Corporation, New York, N.Y.

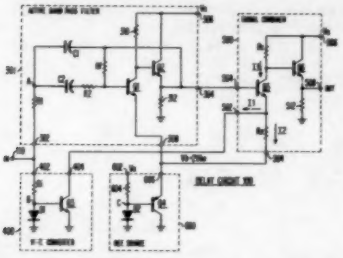
Filed May 29, 1981, Ser. No. 268,374
Int. Cl.³ H23F 3/68
U.S. Cl. 330—295 7 Claims

1. In a delay circuit of the type comprising an input node for receiving an input signal to be delayed, active bandpass filter means having an input coupled to said node and an output for providing a bandpass filtered output signal voltage, voltage-to-current converter means having an input coupled to said node and an output for providing an output signal current proportional to the amplitude of said input signal and independent of

the frequency thereof, and active signal combining means responsive to said signal voltage and to said signal current for providing a delayed output signal, the improvement for minimizing quiescent power dissipation of said delay circuit, characterized in that:

said filter means includes first transistor means biased to regulate a DC component of said output signal voltage at a predetermined value equal to the sum of a DC reference voltage supplied to said first transistor means and a threshold voltage characteristic of said first transistor means;

said combiner means includes second transistor means having a threshold voltage substantially equal to that of said first transistor means, having a control electrode coupled



to receive said signal voltage, having a conduction path coupled at a first end thereof to a source of supply voltage via a load resistor for developing said delayed signal and coupled at a second end thereof to receive said signal current, said signal current including a DC component providing the sole source of quiescent operating current for said second transistor means; and

a resistor in said combiner means coupled between said second end of said conduction path of said second transistor means and a source of said DC reference voltage for maintaining a substantially zero quiescent power dissipation in said resistor means, said resistor means controlling the ratio of components of said delayed signal attributable to said signal current and to said signal voltage.

4,422,053

FREQUENCY MODULATOR INCLUDING FREQUENCY SYNTHESIZER

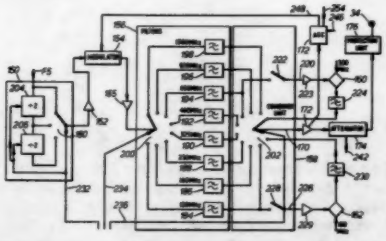
David Brewerton, Bracknell, and Peter P. R. Connell, Marlow, both of England, assignors to Racal-Dana Instruments Limited, Bracknell, England

Division of Ser. No. 123,267, Feb. 21, 1980, Pat. No. 4,322,692. This application Sep. 8, 1981, Ser. No. 300,280

Claims priority, application United Kingdom, Mar. 6, 1979, 7907795

Int. Cl.³ H03C *3/00*

U.S. Cl. 332—16 R **2 Claims**



1. An electrical circuit arrangement for producing a frequency modulated output frequency having a predetermined step-wise-variable carrier frequency, comprising

adjustable frequency generating means producing a first frequency signal having a predetermined nominal value,

frequency modulating means for adjusting the first frequency signal over a predetermined range which is a small fraction of the nominal value,

means producing a fixed frequency signal such that the sum of its value and of the said nominal value divided by a fixed division factor is the same as the nominal value,

a frequency divider connected to divide the frequency modulated first frequency signal by the said fixed division factor,

means producing an intermediate frequency comprising adding means for adding the fixed frequency signal to the divided frequency-modulated first frequency signal,

means producing a stepped frequency signal whose frequency is variable over a predetermined range in steps each of predetermined size,

combining means connected to combine the stepped frequency signal and the said intermediate frequency, and

subtracting means connected to subtract a frequency having the said nominal value from the output of the combining means to produce the said output frequency.

4,422,054

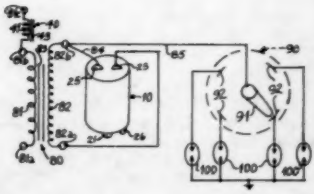
DISTRIBUTED INDUCTIVE-CAPACITIVE HIGH VOLTAGE IGNITION CABLE

Martin E. Gerry, 13452 Winthrope St., Santa Ana, Calif. 92705

Continuation-in-part of Ser. No. 282,755, Jul. 13, 1981, and a continuation-in-part of Ser. No. 282,756, Jul. 13, 1981. This application Feb. 3, 1982, Ser. No. 345,462

Int. Cl.³ H03H *7/01*; H05K *9/00*; H01B *7/34*

U.S. Cl. 333—12 **10 Claims**



1. A high voltage distributed inductance-capacitance cable for an electrical ignition system of a fuel burning engine, said system having an ignition transformer with primary and secondary windings, said cable being coupled to the secondary winding, wherein said cable comprises the combination of:

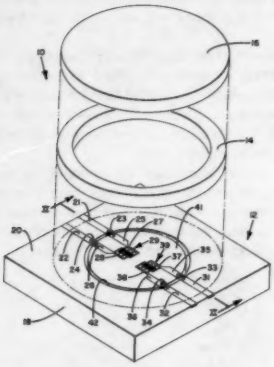
an electrically conductive electrode elongated along the length of said cable; and

a distributed inductor coaxial with and electrically insulated from said electrode, said electrode and inductor being coupled to each other by distributed capacity therebetween along the length of said cable, said cable having a first end and a second end, said electrode being open-circuited at the first end and said inductor being open-circuited at the second end, said inductor at the first end and said electrode at the second end being connective portions of the cable.

4,422,055
STRAIN RELIEF TECHNIQUE FOR SURFACE ACOUSTIC WAVE DEVICES

Donald E. Cullen, Manchester; Gary K. Montress, Glastonbury; Meyer Gilden, West Hartford, and Robert A. Wagner, Manchester, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Oct. 30, 1981, Ser. No. 316,699
Int. Cl.³ H03H 9/10, 9/64, 9/42
U.S. Cl. 333—151 4 Claims

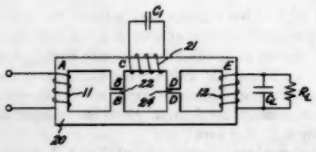


1. A surface acoustic wave (SAW) device, comprising:
an elastic SAW substrate having a surface with at least one strain sensitive surface area;
a cover bonded to the elastic SAW substrate to form a chamber above at least a portion of one of the strain sensitive surface areas of the elastic SAW substrate;
a cut extending into the elastic SAW substrate and surrounding a selected surface region of the portion of the strain sensitive surface area which is within the chamber formed by the cover, said cut having a width and a depth sufficient to isolate the selected surface region from surface strains originating outside the selected surface region;
at least one acousto-electric coupling means disposed on the isolated surface region; and
connector means for electrically connecting each acousto-electric coupling means to electronic circuitry.

4,422,056
INTEGRATED MULTI-STAGE ELECTRICAL FILTER

Victor D. Roberts, Burnt Hills, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Sep. 28, 1981, Ser. No. 305,819
Int. Cl.³ H03H 7/09
U.S. Cl. 333—177 3 Claims

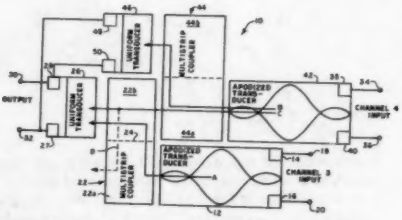


1. An integrated electrical filter employing magnetic components comprising:
a closed magnetic loop multi-legged core having a first pair of legs comprising one gapped leg and one ungapped leg and a second pair of legs comprising one gapped leg and one ungapped leg, said first pair of legs positioned adjacent said second pair of legs on said core and connected to one another by series connected portions of the core;
a first winding disposed on the ungapped leg in said first pair of legs;
a second winding disposed on the ungapped leg in said second pair of legs;
a third winding disposed on one of said series connected core portion joining said first pair of legs to said second pair of legs; and
a capacitor connected across said third winding.

4,422,057
SURFACE WAVE FILTER WITH REDUCED SUBSTRATE SIZE

Michael Garbacz, Norridge, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Apr. 22, 1982, Ser. No. 370,705
Int. Cl.³ H03H 9/25, 9/64, 9/72
U.S. Cl. 333—194 12 Claims

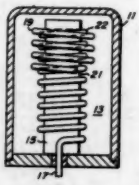


1. In an acoustic surface wave multiplexing filter having a substrate, first and second input transducers, first and second output transducers, and first and second multistrip couplers for coupling acoustic surface waves from the input transducers to the output transducers, an improved architecture for the filter characterized in that the first and second multistrip couplers are formed on the substrate in a position of side-by-side overlap with each other, with each multistrip coupler being disposed between one of the input transducers and one of the output transducers.

4,422,058
FOLDED-OVER HELICAL RESONATOR

Peter Vizmuller, Thornhill, Canada, assignor to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 10, 1981, Ser. No. 319,849
Int. Cl.³ H01P 1/201, 1/208, 7/00
U.S. Cl. 333—202 6 Claims



1. In a helical resonator which includes a housing to form a conductive shield and a helical conductive coil disposed within the housing, the improvement characterized by the conductive coil having a first portion being wound to form a cylindrical helix having a given pitch with one end of the first portion being connected to the housing, and a second portion extending from the first portion and being wound to create a winding

of opposite pitch so as to eliminate third harmonic re-resonance.

4,422,059

BAND-PASS FILTER HAVING MULTILAYERED COIL STRUCTURES

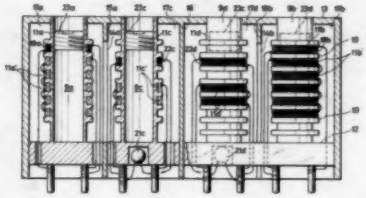
Tsuneharu Fuji, Neyagawa; Masakatsu Tsumura, Shijonawate, and Takayoshi Ishikawa, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 31, 1982, Ser. No. 363,998

Claims priority, application Japan, Apr. 8, 1981, 56-53415; Dec. 8, 1981, 56-198089

Int. Cl.³ H01P 1/201, 7/00, 1/205

U.S. Cl. 333—202 8 Claims



1. A band-pass filter comprising within a shielded housing having first and second chambers separated by a shielding plate:

first and second quarter-wavelength resonators mounted respectively in said first and second chambers and each comprising a bobbin formed with a plurality of axially spaced apart fins and a multilayered coil structure having a plurality of coil portions each mounted between adjacent ones of said fins, said coil structure being open-circuited at one end thereof and short-circuited at the other end;

first and second parallel-circuit resonators mounted respectively in said first and second chambers to provide interstage coupling with said first and second quarter-wavelength resonators and each comprising a capacitor and a bobbin having a plurality of fins and a multilayered coil structure having a plurality of coil portions each mounted between adjacent ones of the fins of said bobbins, one end of each of said parallel-circuit resonators being coupled to one end of the other parallel-circuit resonator at a circuit point outside of said shielded housing;

first and second auxiliary coils inductively coupled with said first and second parallel-circuit resonators respectively, one end of each of said auxiliary coils being short-circuited and the other ends of said auxiliary coils being coupled together to said circuit point; and

an input and an output coupling coil respectively coupled inductively with said quarter-wavelength resonators.

4,422,060

D.C. ELECTROMAGNETIC ACTUATOR

Norio Matsumoto, Kumagaya, and Teruo Umehara, Hanyu, both of Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan

Filed Jan. 15, 1982, Ser. No. 339,653

Claims priority, application Japan, Aug. 21, 1981, 56-123955[U]

Int. Cl.³ H01F 7/08

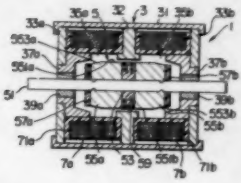
U.S. Cl. 335—256 17 Claims

1. A direct current actuator for use in a vehicle door locking device, adapted to be operated by means of an electric switch, said actuator comprising:

a yoke apparatus having a hollow cylindrical yoke member, an annular center yoke member projecting inwardly from the middle inner peripheral surface of said cylindrical yoke member, a pair of end yoke means disposed in opposite end portions of said cylindrical yoke member to axially separate from said center yoke member to form a magnetic gap therebetween;

two annular solenoid coil means supported by said yoke apparatus therein and disposed axially separately in such a manner that the poles of the same polarity are generated in the adjacent end portions of said solenoid coils when they are energized; and

a moving means disposed in a space defined by said yoke apparatus and having a predetermined annular gap between the periphery of said moving means and said yoke



apparatus so as to reciprocate in said space, said moving means having an axially magnetized permanent magnet, a pair of magnetic members attached to the axially opposite ends of said permanent magnet, and a shaft engaging with said permanent magnet, each of said magnetic members including an annular portion attached to said permanent magnet and a tapered portion tapered toward the adjacent end of said actuator, and said end yoke means being so shaped as to be able to receive said tapered portion of said magnetic member.

4,422,061

LAMINATED CORE OF TRANSFORMER

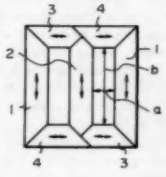
Takaaki Yamamoto, and Yoshiairo Ohya, both of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Sep. 2, 1981, Ser. No. 298,800

Claims priority, application Japan, Jan. 29, 1981, 56-10870

Int. Cl.³ H01F 27/24

U.S. Cl. 336—218 5 Claims



1. A three-phase transformer having a laminated core of the type having at least three legs and at least two yokes joining said at least three legs, the three-phase transformer further having at least three coils wound on respective ones of the legs, the three-phase transformer further comprising:

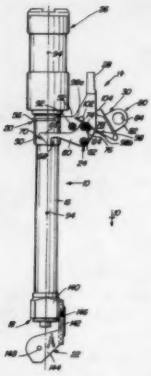
a plurality of leg portion laminate layers formed of a first grain-oriented silicon steel sheet having a first degree of grain orientation; and

a plurality of yoke portion laminate layers formed of a second grain-oriented silicon steel sheet having a second degree of grain orientation, in each of the at least two yokes, said first degree of grain orientation being higher than said second degree of grain orientation.

4,422,062
APPARATUS FOR ASSOCIATING AN ELECTRICAL DEVICE WITH A MOUNTING THEREFOR

Bruce A. Biller, Chicago; Henry W. Scherer, Mt. Prospect, and Roy Swanson, North Riverside, all of Ill., assignors to S&C Electric Company, Chicago, Ill.

Filed Oct. 6, 1982, Ser. No. 433,077
Int. Cl.³ H01H 71/10
U.S. Cl. 337—171 33 Claims



1. Improved apparatus for associating an electrical device with a mounting, the mounting including first and second insulatively spaced brackets; each end of the device being adjacent a respective bracket when the device is closed in the mounting; a first end of the device carrying a trunnion which is insertable into and removable from a hinge on the first bracket; the device being rotatable when the trunnion is in the hinge to move a second end of the device toward the second bracket during closing movement of the device and to move the second end of the device away from the second bracket during opening movement of the device; the second end of the device carrying an assembly which is manipulable (a) to insert the trunnion into the hinge, (b) to rotate the device after such insertion for closing the device upon application to the assembly of a pushing force generally transverse to the device, (c) to rotate the device when the trunnion is in the hinge for opening the device upon application to the assembly of a pulling force generally transverse to the device, and (d) to remove the trunnion from the hinge after such opening; the second bracket including a latch member; the second end of the device also carrying latch means movable between a normal first position, whereat the latch member and the latch means are engageable, and a second position, whereat the latch member and the latch means are disengageable, engagement of the latch member and the latch means when the trunnion is in the hinge maintaining the device closed, and disengagement of the latch member and the latch means when the trunnion is in the hinge permitting opening of the device; wherein the improvement comprises:

first means for mounting the assembly to the second end of the device for limited reciprocating movement of the assembly from a first normal location to a second location upon application of the pulling force to the assembly, the first and second locations residing at different distances from the device on a line of reciprocating movement which is generally transverse to the device;

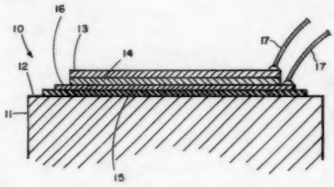
means for moving the latch means out of its first position and toward its second position in response to reciprocating movement of the assembly out of its first location and toward its second location; and

second means for mounting the assembly to the second end of the device for limited pivoting thereon relative to the device, which pivoting is independent of the reciprocating movement of the assembly and affects neither the location of the assembly nor the position of the latch means, the line of reciprocating movement of the assembly assuming different generally transverse positions relative to the device in various pivotal orientations of the assembly, so that the pivotal orientation of the assembly is continuously changeable or adjustable force, during, and after the application of the pushing force or the pulling force thereto without affecting the position of the latch means, and so that the assembly may be reciprocated regardless of the pivotal orientation thereof.

4,422,063
SEMICONDUCTOR STRAIN GAUGE

Roger W. Pryor, Trumbull, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Apr. 1, 1982, Ser. No. 364,557
Int. Cl.³ G01L 1/22
U.S. Cl. 338—2 7 Claims

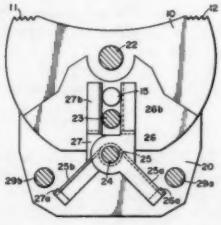


1. A semiconductor strain gauge comprising: an elastic member having a surface subject to stress; a semiconductor substrate secured to said surface, the substrate including at least one PN junction wherein both the P type and N type material is composed of amorphous semiconducting material; and electrical connection means for conducting a signal indicative of strain.

4,422,064
ELECTRICAL RESISTANCE REGULATOR

Toshio Araki, Yokohama, and Kenji Fujikawa, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 3, 1981, Ser. No. 299,090
Claims priority, application Japan, Sep. 10, 1980, 55-128689[U]
Int. Cl.³ H01C 10/32
U.S. Cl. 338—162 16 Claims



1. A regulator comprising:

a housing;

an operating member having a central portion which is rotatably supported on said housing;

a projection provided on said operating member;

two movable members rotatably supported on said housing to push back said projection in a predetermined direction;

a spring secured to said movable members to bias them in opposite directions;

a limit member provided on said housing to limit the approach limit amount of said movable members;

an electrical resistor provided on said housing; and

a sliding member provided on said operating member and slidable on said electrical resistor.

4,422,065

METHOD FOR READOUT FORM MULTISCALE ENCODERS AND A MULTITURN ABSOLUTE ANGLE-CODE CONVERTER

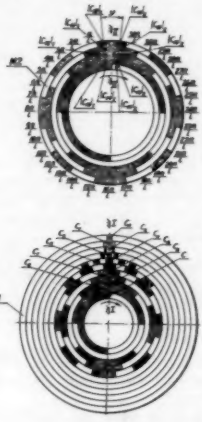
Radomir V. Radomirov; Kolyo R. Kolev, both of Stara Zagora; Encho M. Enchev, Nova Zagora, and Ivan N. Ivanov, Gabrovo, all of Bulgaria, assignors to Nauchno Proizvodstven Kombinat Po Robotika "Beroe", Stara Zagora, Bulgaria

Filed Jan. 18, 1980, Ser. No. 113,292

Claims priority, application Bulgaria, Jan. 18, 1979, 42122

Int. Cl.³ H03K *13/18*

U.S. Cl. 340—347 P **2 Claims**



1. In a method for readout from multiscale encoders having coarse and fine readout masks, wherein the fine readout digits information signals are formed in Gray code immediately by the read elements of the fine readout mask, and for every digit of the coarse readout mask there is formed by analogy in Gray code an auxiliary pair of signals, and comprising anticipating and delaying electrical signals dephased with respect to the theoretical information signal of the corresponding coarse readout digit of an angle equal to half of the angle discretion of the coarse readout mask, the improvement comprising forming the actual coarse readout information signals in Gray code without the immediate participation of the read elements of the coarse readout mask, dividing the period of the theoretical information signal of every coarse readout digit into four intervals which are coded with the aid of four binary patterns 00, 10, 01, and 11 which are formed from logical levels "0" and "1" of the corresponding auxiliary pair of signals, in the intervals of the period that are coded by binary patterns 00 and 11 forming the logical levels "0" and "1" of the actual information signals of all coarse readout digits in accordance with the Gray code, switching on a common source of logical level "0" and a common source of logical level "1" in the remaining intervals coded by binary patterns 10 and 01, the front and rear edges of all actual coarse readout information signals being formed where, according to the Gray code, the inverted and the non-inverted imitating signal is used, which is equal in form and periodicity with the information signal of the highest-ranking fine readout digit and is dephased in accordance to in a quarter of its period and is formed by an additional read element of the fine readout mask.

4,422,066

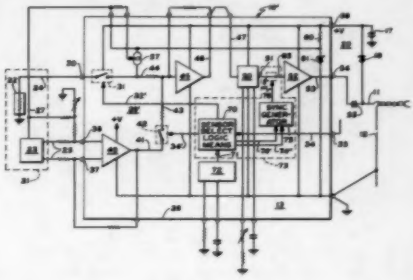
CONDITION SENSOR INTERFACE MEANS

Francis J. Belcourt, Shakopee, and Martin J. van Dyke, Brooklyn Park, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 8, 1981, Ser. No. 309,739

Int. Cl.³ G08B *23/00*; H01N *35/00*

U.S. Cl. 340—500 **13 Claims**



1. A condition sensor interface means responsive to sensor means with said interface means utilizing a pair of input conductors to both power said interface means and to output information from said sensor means, including: condition sensor means responsive to at least one condition to be sensed; sensor interface means including sensor input means connected to said sensor means with said sensor interface means having two modes of operations; said sensor interface means having mode selection means whereby two sensing modes are selectable within said sensor interface means by the application of two different mode selection voltages to said mode selection means; said sensor interface means further including digital signal output means which has input means responsive to said sensor means through said mode selection means; power terminal means for said sensor interface means with said terminal means adapted to be connected by said pair of conductors to a direct current source to energize said sensor interface means; and said digital signal output means having output circuit means connected to said pair of input conductors to load said direct current source to in turn provide a digital output signal on said pair of conductors in response to a condition sensed by said sensor means.

4,422,067

DYNAMIC SELF-CHECKING SAFETY CIRCUIT MEANS

Rodney L. Clark, Dakota; William R. Landis, Hennepin; Paul B. Patton, Anoka, and Charles B. Yancey, Hennepin, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

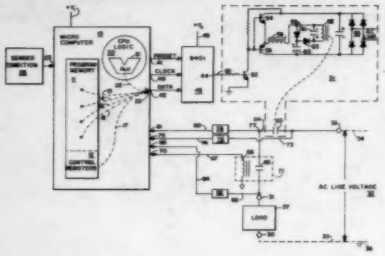
Filed Oct. 5, 1981, Ser. No. 308,703

Int. Cl.³ G08B *29/00*

U.S. Cl. 340—508 **12 Claims**

1. A dynamic self-checking safety circuit means adapted for control of electric power to a load, including: condition responsive circuit means including repetitively operated signal generating means for generating a series of logic bits conditioned upon the normal operation of said condition responsive circuit means; clock means having clock output means providing timed output signals; preset signal generating means providing a preset signal; cyclic redundancy checker means connected to said condition responsive circuit means, to said clock means, and to said preset signal generating means to receive said logic bits, said timed output signals, and said preset signals; said cyclic redundancy checker means having circuit means capable of properly identifying said series of logic bits conditioned upon the normal operation of said condition responsive circuit means; said cyclic redundancy checker means having output means providing output signals that cycle each time

said cyclic redundancy checker means receives said series of logic bits and then said preset signal; cyclic signal detecting circuit having an input connected to said cyclic redundancy checker output means, and having safety switch means as an output; load control switch means connected to said condition responsive circuit means and controlled thereby; and said two



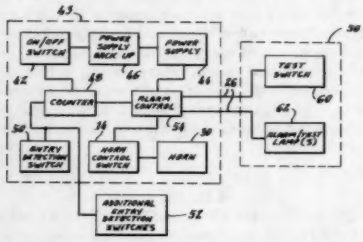
switch means being connected in series circuit and adapted to connect said load to said electric power upon said condition responsive circuit means causing said load control switch means to operate with said cyclic redundancy checker means operating the said cyclic signal detecting circuit to in turn operate said safety switch means.

4,422,068

INTRUSION ALARM SYSTEM FOR PREVENTING ACTUAL CONFRONTATION WITH AN INTRUDER

John M. Helft, Center Rd., Eagle Bridge, N.Y. 12057, and Walter O. Noyes, 308 Elm St., Bennington, Vt. 05201

Filed Jun. 18, 1981, Ser. No. 275,734
Int. Cl.³ G08B *29/00*
U.S. Cl. 340—514 **20 Claims**



1. An intrusion detection system adapted to provide an intrusion detection signal observable from outside of a protected premises to warn a returning occupant of a possible intrusion and thereby avoid a potential confrontation between the returning occupant and an intruder within the protected premises, said detection system comprising:

an alarm lamp mountable on an entrance to the protected premises and observable from without said protected premises,

means for actuating said alarm lamp in response to an intrusion through the entrance of said protected premises, and

a test circuit coupled to said means for actuating said alarm lamp for providing a test signal, said test circuit being mountable on said entrance to the protected premises such that it is operable from without the protected premises for determining if said means for actuating said alarm lamp is operational, said test circuit being positionable such that said test signal is discernable from without the protected premises,

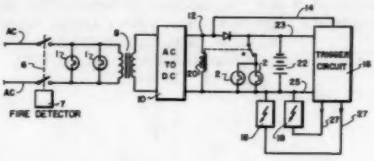
whereby said alarm lamp is observable from without said protected premises and said test circuit is operable from without the protected premises.

4,422,069

SYSTEM FOR INDICATING AN EMERGENCY EXIT

Karl L. Edström, Batterivägen 60,, 951 00 Lulea, Sweden, and Per A. W. Högström, 71 Duke St., London W1, England

Filed Oct. 15, 1981, Ser. No. 311,760
Claims priority, application Sweden, Oct. 17, 1980, 8007308
Int. Cl.³ G08B *5/38, 17/00, 21/00*
U.S. Cl. 340—691 **7 Claims**



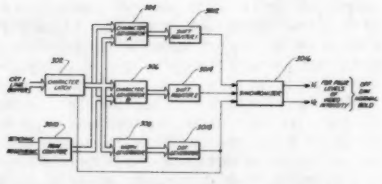
1. A system for indicating an emergency exit in case of fire in a building, comprising at least one flashable light located near floor level adjacent to the emergency exit and having an associated drive unit including a trigger circuit and accumulator batteries, said drive unit being arranged for connection to a mains supply voltage power source, and means for sensing interruption of the supply voltage to the drive unit and operable to actuate the trigger circuit upon such interruption to thereby initiate the energization and flashing of said flashable light from said accumulator batteries.

4,422,070

CIRCUIT FOR CONTROLLING CHARACTER ATTRIBUTES IN A WORD PROCESSING SYSTEM HAVING A DISPLAY

Robert A. Couper, Sunnyvale; John K. Frediani, Santa Cruz, and Terrance L. Lillie, Palo Alto, all of Calif., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Aug. 12, 1980, Ser. No. 177,651
Int. Cl.³ G09G *1/06*
U.S. Cl. 340—723 **15 Claims**



1. A system for character attribute control comprising:

(a) a display for displaying a plurality of lines of such characters;

(b) a display control circuit means for controlling the information exhibited on said display, said display control circuit means being responsive to an input of digital words, a first portion of said input words defining particular characters and a second portion of said input words defining the attributes associated with said defined characters, whereby a sequence of said input words will define a line of characters and associated attributes to be displayed;

(c) a refresh memory for storing sequences of data words, said data words comprising data words defining characters and control words defining information about the display of said characters, said control words further comprising attribute control words for controllng the attributes associated with characters defined by character

data words stored between said attribute control words and the next control word belonging to a preselected subgroup of said control words; and

(d) line buffer means operatively connected between said refresh memory and said display control circuit means for transferring lines of characters from said memory to said display control circuit means, said line buffer means further comprising:

(1) memory access means for controlling access to a selected subsequence of said data words in said refresh memory, said subsequences defining at least a line of characters to be displayed;

(2) buffer storage wherein data words from said memory may be stored under control of said memory access means, said buffer storage being operatively associated with said display control circuit means so that the output of said storage provides said input word to said display control circuit means;

(3) character attribute control circuit means for recognizing said control data words as they are read from said memory and preventing said attribute control words from being stored in said buffer storage and for storing the attribute information in additional bits provided in each word of said buffer storage so that the attribute information is stored in the same buffer storage word as each of the associated character data words, whereby said input words are formed and stored in said buffer storage; and

(4) buffer control means operatively associated with said display control means for controlling said buffer means so that said sequence is stored in said buffer storage and at least a portion of said subsequence is then output to said display control circuit means whereby a line of characters with associated attributes is displayed.

4,422,071

PAGING RECEIVER

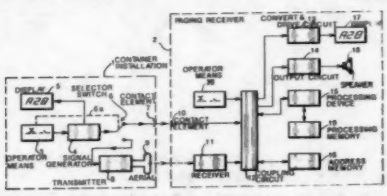
Nicolaas R. de Graaf, Emmen, Netherlands, assignor to Nira International B.V., Emen, Netherlands

Filed Jan. 26, 1981, Ser. No. 228,473

Claims priority, application Netherlands, Jan. 30, 1980, 8000578

Int. Cl.³ G08B 5/22

U.S. Cl. 340—825.44 **6 Claims**



1. A programmable paging receiver comprising: address memory means that are freely programmable from exterior of said receiver, for storing therein at least one desired programmable address code used to select that particular receiver; comparator means for comparing the programmed address code and a received address code, to determine whether that particular receiver is to be selected in response to the received address code; meas for receiving and processing programming signals for changing the stored address code; a display device; and message coding means cooperating with the display device to represent on the display device a received message code and an address code, whereby the address code used to select that particular receiver may be variably programmed, and the programmed address code verified on the display device.

4,422,072

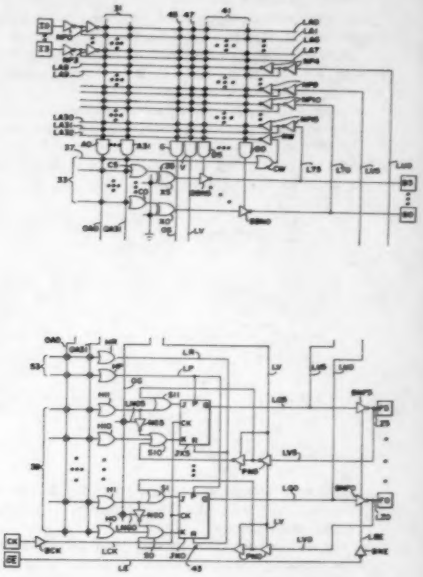
FIELD PROGRAMMABLE LOGIC ARRAY CIRCUIT

Napoleone Cavlan, Cupertino, Calif., assignor to Signetics Corporation, Sunnyvale, Calif.

Filed Jul. 30, 1981, Ser. No. 288,576

Int. Cl.³ H04Q 9/00

U.S. Cl. 340—825.87 **46 Claims**



1. A programmable logic circuit characterized as comprising:

a plurality of first lines, one part of which comprises input lines for receiving input data to the circuit and another part of which comprises feedback lines;

a plurality of logic AND/NAND gates, each having an output section and having a plurality of input sections each connected to a different one of the first lines;

a plurality of second lines corresponding on a one-to-one basis to the logic gates for transmitting output data respectively from their output sections;

feedback means for supplying output data from the second lines to the feedback lines;

a plurality of buffers corresponding on a one-to-one basis to at least part of the logic gates and respectively coupled between their output sections and the second lines, each buffer having a buffer control line for receiving control data to control activation of that buffer;

at least one control AND/NAND gate, each having an output section coupled to at least two of the buffer control lines and having a plurality of input sections each connected to a different one of the first lines; and

programmable means for selectively connecting each input section of each AND/NAND gate to its output section.

4,422,073

COMBUSTIBLE GAS DETECTION SYSTEM

Joe K. Winner, Pinellas, Fla., assignor to The Bendix Corporation, Southfield, Mich.

Filed Oct. 27, 1981, Ser. No. 315,684

Int. Cl.³ G08C 19/16, 19/36

U.S. Cl. 340—870.21 **1 Claim**

1. In a combustible gas detection system having a central

control station and a remotely located combustible gas sensor of the catalytically activated resistance bridge type providing an analog signal indicative of the concentration of combustible gas at the sensor location, a noise immune transmission system for transmitting signals from said sensor to said control station, comprising

a two-wire transmission line connecting said control station with said sensor location,

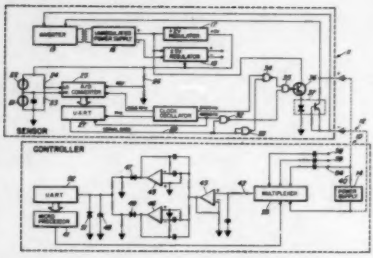
means supplying d.c. power to said transmission line;

means at said sensor location for converting d.c. power received from said transmission line to a.c. power;

means for converting said a.c. power to regulated d.c. operating power for said sensor;

an analog to digital converter at said sensor location for converting said analog signal from said sensor into a parallel format binary digital signal;

means for converting said parallel format digital signal into a serial format digital signal;



a clock oscillator at said sensor providing at least a pair of harmonically related, phase coherent clock signals of different frequency;

keying means controlled by said serial format digital signal for selecting one of said clock signals upon the appearance of a logic "1" in said serial digital signal and for selecting the other of said clock signals upon the appearance of a logic "0" in said serial digital signal; and

an optically coupled isolator for applying said clock signal selected by said keying means to said transmission line, said isolator including

a light emitting diode to which said clock signal selected by said keying means is applied,

a load resistor, and

a phototransistor connected through said load resistor to said transmission line, said phototransistor responding to light emitted by said light emitting diode to vary current through said load resistor.

4,422,074

SIGNAL SKIMMING SYSTEM

Barry E. Williams, Downey; Norol T. Evans, San Pedro, and John A. Propster, La Mirada, all of Calif., assignors to Hughes Aircraft Company, El Segundo, Calif.

Filed May 26, 1965, Ser. No. 458,971
Int. Cl.³ G01S *13/16*
U.S. Cl. 343—5 CF **12 Claims**

1. A system responsive to a composite signal including first signals in the presence of second signals and detecting the presence of said first signals with a selected threshold level ratio of signal voltage to noise voltage comprising

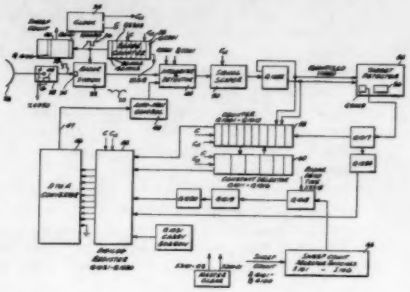
means for integrating the composite signal over selected intervals of time,

means for comparing a selectable threshold level with the integrated signals,

means for storing data to provide said threshold level,

counting means responsive to the integrated signals exceeding the threshold level to accumulate a count thereof,

constant selector means responsive to the count of said counting means to establish a proportion of the value of said stored data for changing said threshold level to maintain the selected threshold level ratio,



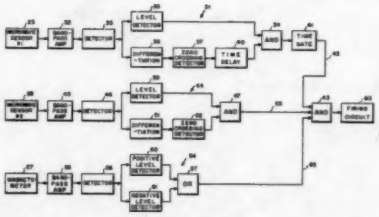
and means responsive to said constant selector means for correcting the stored data after a selected number of said intervals of time.

4,422,075

PROXIMITY MONITOR

Eldon Nerheim, Hopkins, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed May 21, 1981, Ser. No. 265,880
Int. Cl.³ G01S *13/86*; F42C *13/04*
U.S. Cl. 343—6 R **2 Claims**



1. In a proximity monitor for movement at a selected distance from a surface, in combination:

a first microwave sensor having an antenna pattern directed toward said surface, the principal component of said pattern parallel to said surface being in the direction of said movement;

a second microwave sensor having a second antenna pattern directed toward said surface, the principal component of said second pattern parallel to said surface being in a direction opposite to that of said movement, said patterns being mutually spaced, at said surface, in said direction of movement;

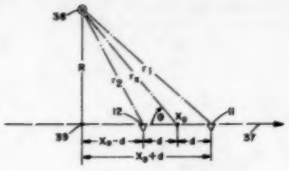
a magnetic anomaly sensor giving an output representative of the presence at said surface of a magnetic anomaly located between said patterns; and

means connected to said sensors, including time delay means connected to said first sensor, for performing a control function when the signals from said sensors are above predetermined levels in a predetermined time relationship.

4,422,076
PASSIVE SYNTHETIC APERTURE SYSTEM FOR LOCATING A SOURCE OF ELECTROMAGNETIC RADIATION

Gus P. Tricoles, San Diego, and Eugene L. Rope, El Cajon, both of Calif., assignors to General Dynamics Corporation, Electronics Division, San Diego, Calif.

Filed Jul. 24, 1980, Ser. No. 171,979
Int. Cl.³ G01S 3/02, 5/02
U.S. Cl. 343—458 **2 Claims**



1. A vehicle-mounted system for locating a source of electromagnetic radiation having a given wavelength, comprising

first and second receiving antennas mounted to a vehicle and spaced apart from each other by a predetermined distance in the principle direction of motion associated with said vehicle for respectively providing first and second received signals in response to electromagnetic radiation having said given wavelength received by the first and second antennas;

a first phase sensitive receiver coupled to the first and second antennas for responding to the first and second received signals by providing a first phase difference signal that indicates a phase difference ϕ_{21} that is proportional to the difference between the respective ranges from the first and second antennas to the source of said received radiation when said received radiation is radiated spherically from said source, whereby the value of the first phase difference signal varies as the vehicle moves in a straight line;

means operable when said vehicle is moving for determining the speed of said vehicle; and

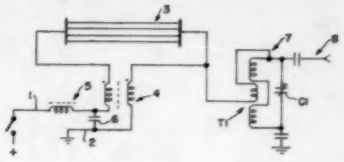
a signal processor coupled to the receiver for processing the values of the first phase difference signal provided as the vehicle moves in a straight line past its point of closest approach to said radiation source in combination with said determination of vehicle speed to determine the range and direction from said vehicle to said source.

4,422,077
ELECTRICAL SIGNAL SEPARATING DEVICE FOR COMBINED WINDSHIELD ANTENNA AND HEATER GRID

Jerzy J. Kropielnicki, Knutsford, England, assignor to B.S.H. Electronics (Manchester) Limited, Manchester, England

Continuation of Ser. No. 105,232, Dec. 19, 1979, abandoned, which is a continuation of Ser. No. 933,289, Aug. 14, 1978, abandoned. This application Mar. 18, 1982, Ser. No. 359,304
Claims priority, application United Kingdom, Aug. 17, 1977, 34443/77
Int. Cl.³ H01Q 1/02, 1/32
U.S. Cl. 343—704 **7 Claims**

1. An isolating and matching device to enable a motor vehicle electrically heated window, not designed specifically to be an antenna or aerial and essentially aperiodic and non-resonant at VHF frequencies, to be used as a transmitting aerial, comprising: an electrical circuit having input leads for connection to a motor vehicle D.C. power supply, power output leads for connection to a window heating element of said motor vehicle electrically heated window, and an aerial input terminal for connection of said electrical circuit to an aerial feeder circuit of a transmitter, the said electrical circuit further including isolating circuitry interconnecting said input leads and said power output leads, and matching and tuning circuitry interconnecting the said power output leads and said aerial input terminal, said isolating circuitry including a bifilar coil formed by two wires wound on a common core and defining two concentric coils and being operative to permit passage of current from said motor vehicle D.C. power supply to heat said window while isolating or blocking passage of radio signals from said

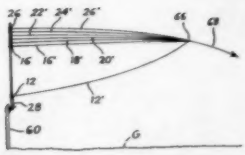


window heating element to said motor vehicle D.C. power supply, and said matching and tuning circuitry being operative to effectively match the impedance of the entire said window heating element to said aerial feeder circuit of a transmitter so that efficient VHF transmission, from said motor vehicle electrically heated window of signals received at said aerial input terminal, is effected.

4,422,078
FULL WAVE COMMUNICATION ANTENNA

Melvin L. Cremeen, 643 Edgewater NW., Space F-1, Salem, Oreg. 97304

Continuation of Ser. No. 210,127, Nov. 24, 1980. This application Aug. 27, 1982, Ser. No. 412,177
Int. Cl.³ H01Q 1/36
U.S. Cl. 343—895 **4 Claims**



1. A full wave communication antenna for use with communication equipment, comprising:

(a) an elongated antenna rod of dielectric material of substantially uniform diameter and defining the top and bottom ends of a vertical antenna, and

(b) an antenna wire of length corresponding to a selected radiation frequency, wrapped about the rod to provide

(1) a radiating base coil adjacent the bottom end of the rod, the bottom end of the base coil wire being arranged for connection to communication equipment,

(2) a substantially non-radiating antenna wire section extending along the rod from the top end of the base coil toward the top end of the rod a length greater than one-half the length of the rod, and

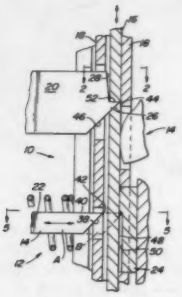
(3) a plurality of longitudinally closely spaced radiating loading coils of substantially equal numbers of a plurality of coil turns extending along the rod from the non-radiating wire section toward the top end of the rod,

(4) the base and loading coils being configured to produce vertical radiation field patterns at substantially the selected radiation frequency and which field patterns merge together a distance radially outward of the rod and there change to a horizontal field pattern which proceeds downward to the ground.

4,422,079
TIME RECORDER REGISTRATION APPARATUS

George Franke, Amherst, N.H., assignor to Simplex Time Recorder Co., Gardner, Mass.

Filed Feb. 20, 1981, Ser. No. 236,392
Int. Cl.³ G01D 15/04
U.S. Cl. 346—1.1 9 Claims



9. Method of aligning a time card in registry with a printing means comprising:

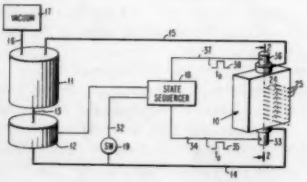
moving a punch in a direction substantially perpendicular to said card such that said punch cuts the card fibers and spreads the card fibers as they are cut without removing material from the card to form a deformation having an upper surface and a lower surface inclined with respect to said upper surface, said upper and lower surfaces terminating at a slit, and

supporting said card at a deformation by contacting substantially the entire deformation upper and lower surfaces by moving a sensing surface into said deformation in a direction substantially perpendicular to the card face such that said sensing surface contacts substantially the entire deformation upper and lower surfaces.

4,422,080
INK JET PRINTING METHOD AND APPARATUS

Stanley C. Titcomb, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 17, 1981, Ser. No. 331,695
Int. Cl.³ G01D 15/18
U.S. Cl. 346—1.1 8 Claims



1. The method for control of ink from a pressurized fluid reservoir to an ink jet print head comprising an ink cavity having at least one orifice in fluid communication with the ink cavity, wherein the improvement comprises the steps of:

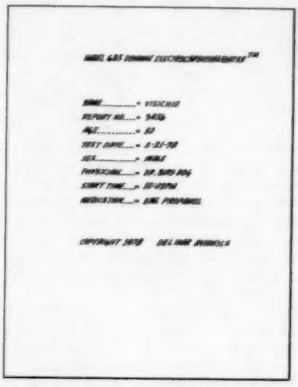
establishing an operative mode in which the entire ink cavity is full of fluid at a pressure such that fluid issues as a stream from said orifice; and

thereafter establishing an idle mode in which no printing occurs by sealing off the ink cavity full of pressurized fluid thereby to maintain a positive pressure in the fluid in the ink cavity during the ensuing idle mode to prevent fluid from either flowing from said orifice or into said orifice to prevent contaminants from entering said ink jet print head.

4,422,081
VALIDATOR FOR ELECTROCARDIAL DATA PROCESSING SYSTEM

Donald C. Woods, Lompoc, Calif., assignor to Del Mar Avionics, Irvine, Calif.

Division of Ser. No. 88,105, Oct. 24, 1979, which is a continuation-in-part of Ser. No. 957,527, Nov. 3, 1978. This application Apr. 27, 1982, Ser. No. 372,115
Int. Cl.³ G01D 9/00, 9/28; A61B 5/04
U.S. Cl. 346—33 ME 23 Claims



1. Apparatus for controlling the operation of a printer-plotter to produce marks at a high speed on a medium that are representative of electrocardiographic signals generated at a slower real time speed by a patient, then stored in a storage device and later retrieved from the storage device, said apparatus comprising:

formatting means receiving the retrieved electrocardiographic signals and connected to the printer-plotter for controlling it to plot at the high speed successive segments of the retrieved electrocardiographic signals in successive rows juxtaposed along the medium to facilitate visual analysis of the retrieved electrocardiographic signals, said formatting means responsive to applied timing signals to control the printer-plotter to print alpha-numeric symbols adjacent predetermined rows of the plotted electrocardiographic signals to indicate the time of day corresponding to the respective said predetermined rows.

4,422,082
JET NOZZLE PLATE FOR AN INK JET PRINTING HEAD AND METHOD OF MANUFACTURING SUCH A JET NOZZLE PLATE

Friedrich Louzil, Vienna, Austria, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 26, 1981, Ser. No. 314,931
Claims priority, application Austria, Nov. 7, 1980, 5493/80
Int. Cl.³ G01D 15/18
U.S. Cl. 346—75 8 Claims

1. A method of manufacturing a jet nozzle plate for an ink jet

printing head, utilizing a base plate in which there is provided a bore in order to form a jet nozzle, said bore having a diameter which is larger than the inner diameter of the ultimate jet nozzle, the base plate being subsequently covered as a whole unit, as far as into the bore, with a layer of a chemically depositable material characterized in that the base plate and said layer consist of different, selectively chemically etchable materials, the method further comprising the steps of:

milling on the front of the base plate a recess which surrounds the bore mainly concentrically at a distance;

depositing the layer with a thickness which defines the inner diameter of the bore to the inner diameter of the ultimate jet nozzle;

grinding down the front of the base plate by an amount which at least equals the thickness of the layer but which is smaller than the sum of the thickness of the layer and the depth of the recess;

etching the base plate from the front to remove the material of the base plate exposed by the grinding operation until the layer projecting from the bore forms a freely projecting cylindrical tube which is surrounded by a trough.

4,422,083

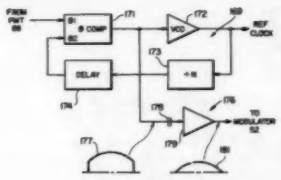
SYSTEM AND METHOD FOR PRODUCING ARTWORK FOR PRINTED CIRCUIT BOARDS

Don B. Neumann, Laguna Beach; Lyle K. Norton, Santa Ana, and Eric V. Olson, Long Beach, all of Calif., assignors to American Hoechst Corporation, Somerville, N.J.

Division of Ser. No. 42,133, May 24, 1979. This application Mar. 19, 1981, Ser. No. 245,674

Int. Cl.³ G01D *9/42;* **H04N** *1/22;* **G03B** *41/00*

U.S. Cl. 346—108 **4 Claims**



1. In a system for forming an image on an output medium in accordance with an input signal: means for providing a beam of coherent radiation, means for modulating the beam in accordance with the input signal, means including a rotating reflector for deflecting the modulated beam to scan the same along a substantially straight line across the output medium, and means for applying a correction signal to the means for modulating the beam to adjust the intensity of the beam to reduce the intensity of the beam toward the ends of the scan line and maintain a substantially uniform exposure across the output medium notwithstanding variations in the velocity of the beam.

4,422,084

FLUID TANK AND DEVICE FOR DETECTING REMAINING FLUID

Shizuo Saito, Shiojiri, Japan, assignor to Epson Corporation, Nagano and Kabushiki Kaisha Suwa Seikosha, Tokyo, both of, Japan

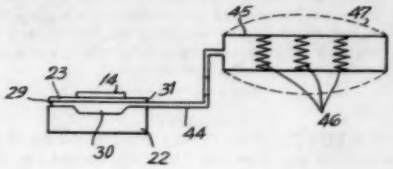
Filed Nov. 5, 1980, Ser. No. 204,115

Claims priority, application Japan, Nov. 6, 1979, 54-143708; Nov. 22, 1979, 54-151824

Int. Cl.³ G01D *18/00*

U.S. Cl. 346—140 R **26 Claims**

1. A negative pressure tank for storing and selectively dispensing a printing fluid for use in an ink jet printer including a nozzle coupled to the tank, the printing fluid being selectively discharged through the nozzle connected to the tank, comprising a vessel for storing said fluid, the walls of said vessel formed of an organic material and including biasing means for generating and maintaining a negative pressure with respect to atmospheric pressure in said vessel said vessel and biasing



means being adapted so that the negative pressure is less than the surface tension of fluid within the nozzle and further within a range so that fluid does not escape from the nozzle when the vessel is disposed at a height above or below the nozzle.

4,422,085

INK LIQUID VISCOSITY CONTROL IN AN INK LIQUID SUPPLY SYSTEM FOR AN INK JET SYSTEM PRINTER

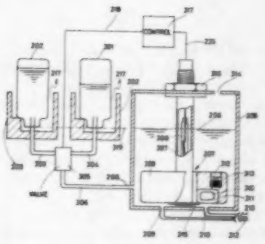
Yuji Sumitomo, Yamatokoriyama, and Yoshio Kanayama, Nabari, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 24, 1981, Ser. No. 247,052

Claims priority, application Japan, Mar. 28, 1980, 55-41762

Int. Cl.³ G01D *15/16;* **G01N** *9/18*

U.S. Cl. 346—140 R **8 Claims**



1. An ink liquid viscosity control system in an ink liquid supply system for an ink jet system printer, said ink liquid supply system comprising an ink liquid reservoir for containing a new ink liquid therein, and a sub tank for containing a predetermined ink liquid supply having an ink liquid level and for introducing the new ink liquid from said ink liquid reservoir and developing the ink liquid to be supplied to an ink droplet issuance unit included in the ink jet system printer, said ink liquid viscosity control system comprising:

a float member being entirely submerged within the ink liquid contained in said sub tank, said float member having a specific gravity slightly greater than a specific gravity of a preferred ink liquid suited for the ink jet system printer;

detection means disposed below the ink liquid level for detecting a movement of said float member while said float member is entirely submerged within said sub tank and producing an output signal indicative thereof, said movement of said float member being caused by a variation in the specific gravity of the ink liquid contained in said sub tank; and

viscosity adjusting means for maintaining the viscosity of the ink liquid contained in said sub tank within a preselected range in response to said output signal produced by said detection means;

said float member normally being entirely submerged, disposed in a lower portion of said sub tank and being unaf-

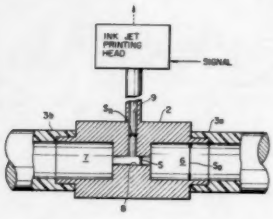
fected by surface tension of the ink liquid level and being periodically, automatically moved upwardly, while still remaining entirely submerged within said ink liquid, in response to an increase in the specific gravity of said ink liquid above the specific gravity of said preferred ink liquid thereby actuating said detection means and producing said output signal for actuating said viscosity adjusting means for effecting a reduction in the viscosity of said ink liquid contained within said sub tank.

4,422,086

DEVICE FOR FEEDING CONSTANT PRESSURE FLUID

Masayoshi Miura, Kawasaki; Gen Oda, Sagamihara; Kenji Akami, Kawasaki, and Hiroshi Naito, Machida, all of Japan, assignors to Matsushita Electric Industrial Company, Limited, Osaka, Japan

Filed Jan. 19, 1982, Ser. No. 340,811
Claims priority, application Japan, Jan. 20, 1981, 56-7724
Int. Cl.³ G01D *15/16*
U.S. Cl. 346—140 R **22 Claims**



1. A device for feeding a fluid under substantially constant pressure to a utilization element having a tendency to be exposed to abrupt variations in fluid pressure, said fluid being supplied to said device through a conduit from a fluid single supply source, comprising:

first means forming a pair of first and second substantially identical chambers respectively connected to the single supply source in a closed loop circuit through first and second sections of said conduit;

second means forming a connecting channel connecting said first and second chambers, the cross section of said connecting channel being smaller than the cross section of each of said first and second chambers; and

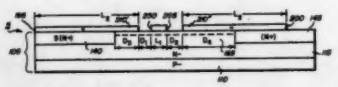
third means forming a passageway connected at one end to a point intermediate opposite ends of said connecting channel and at the other end to said utilization element, said device being operable to absorb transitory pressure variations in said conduit sections to enable said second and third means to deliver fluid under substantially constant pressure to said utilization element.

4,422,087

SELF-ALIGNED SHORT CHANNEL MESFET

Ram S. Ronen, Placentia, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Jun. 3, 1980, Ser. No. 155,995
Int. Cl.³ H01L *29/48*
U.S. Cl. 357—15 **2 Claims**



1. A solid state MESFET device including:

a substrate layer;

a source region, of a given doping concentration, formed in said substrate and having an outer surface extending along a surface of said substrate layer;

a drain region, of a given doping concentration, formed in said substrate and having an outer surface extending along said surface of said substrate layer;

the portion of said substrate layer extending from said source region to said drain region along said surface providing a channel region having an outer surface, said channel region having a doping concentration less than the doping concentrations of said source region and said drain region;

the outer surfaces of said source region, said drain region and said channel region lying in a common plane;

a Schottky gate contact to said channel region;

a metallic drain contact contacting at least a portion of said outer surface of said drain region and a portion of said outer surface of said channel;

a metallic source contact contacting at least a portion of the outer surface of said source region and a portion of said outer surface of said channel;

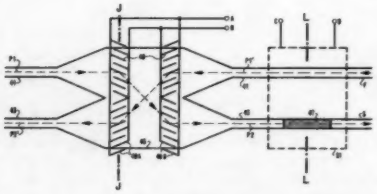
said portions of the outer surface of said channel region in contact with said metallic contacts being short-circuited by such metallic contacts whereby the effective length of said channel region is determined by the distance between said metallic contacts.

4,422,088

BUS ARRANGEMENT FOR INTERCONNECTING CIRCUIT CHIPS

Fritz R. Gfeller, Adliswil, Switzerland, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 7, 1981, Ser. No. 328,306
Claims priority, application European Pat. Off., Apr. 28, 1981, 81103161.3
Int. Cl.³ H01L *31/12;* **G02B** *5/14*
U.S. Cl. 357—19 **6 Claims**



1. A semiconductor module for interconnecting circuit chips comprising:

a substrate including an optical waveguide bus structure at the surface of said substrate, said structure including at least one optical waveguide bus comprising a feeder waveguide and a signal waveguide;

a plurality of separately controllable coupling junctions between each feeder waveguide and its associated signal waveguide; said waveguide each extending longitudinally in a straight line and parallel to each other, the lateral extension of each waveguide gradually increasing symmetrically with respect to the straight axis of the respective waveguides towards the junction on both sides said waveguide propagating light only along the straight axis of each wave guide and a plurality of optical output means on each signal waveguide;

light source means coupled to said substrate for illuminating each said feeder waveguide; and

a plurality of circuit chips mounted on said substrate, each including control elements and photodetector elements;

each of said control elements comprising a pair of said electrode gratings the upper half and lower half of each grating being inclined at inverse angles with respect to each other and to the axis of the associated optical waveguide bus so that when said pair of gratings is electrically excited

light propagating in the respective feeder waveguide is deflected first toward the center of the associated coupling junction and then into the respective signal wave guide;

each of said control elements being located adjacent to a respective coupling junction, and each said photodetector element being located adjacent to a respective optical output means.

4,422,089

SEMICONDUCTOR DEVICE HAVING A REDUCED SURFACE FIELD STRENGTH

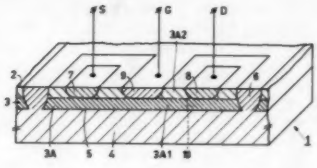
Henricus M. J. Vaes; Johannes A. Appels, and Adrianus W. Ludikhuize, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 22, 1980, Ser. No. 219,160

Claims priority, application Netherlands, Sep. 8, 1980, 8005053

Int. Cl.³ H01L *29/76, 29/78, 29/72*

U.S. Cl. 357—22 **21 Claims**



1. A semiconductor device having a semiconductor body comprising a substrate region of a first conductivity type, a surface-adjoining layer-shaped semiconductor region provided at the surface of said substrate region, at least a substrate region-adjoining part of said layer-shaped semiconductor region being of a second conductivity type opposite to that of said first type and forming a p-n junction with said substrate region, an island-shaped part of said layer-shaped semiconductor region being bounded laterally by a separation region which extends from the surface over substantially the whole thickness of the semiconductor region, at least a first zone of a semiconductor circuit element being provided within said island-shaped part, the overall net doping of the second conductivity type of said layer-shaped semiconductor region in atoms per unit of surface area being sufficiently small such that when a voltage in the reverse direction is applied across said p-n junction the depletion zone within the island-shaped part will extend at least locally from said p-n junction up to the surface at a voltage which is lower than the breakdown voltage of the p-n junction, at least a part of said island-shaped part of the layer-shaped semiconductor region having a doping profile comprising at least two overlying layer portions of different average net doping concentrations between said substrate and said surface.

4,422,090

THIN FILM TRANSISTORS

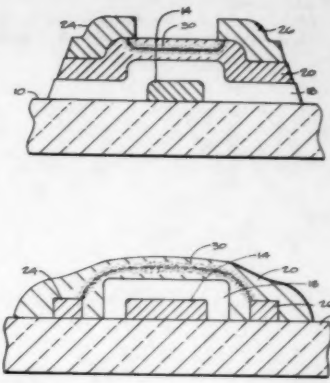
Frank R. Shepherd, Kanata, and William D. Westwood, Nepean, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Continuation-in-part of Ser. No. 60,275, Jul. 25, 1979, abandoned. This application May 26, 1981, Ser. No. 266,630

Int. Cl.³ H01L *29/78*

U.S. Cl. 357—23 **8 Claims**

1. A thin film insulated gate field effect transistor comprising a dielectric substrate and deposited on the substrate a thin film layered structure comprising a dielectric layer, a conducting gate layer, and a semiconductor layer, the dielectric layer sandwiched between the gate and the semiconductor layers, the thin film source and drain terminals contacting the semiconductor layer, the source and drain terminals spaced from one another and further being spaced from the gate layer by the dielectric layer, wherein the thin film semiconductor layer has a non-uniform conductivity across the width thereof being



more conductive over an internal elemental layer than at elemental layers adjacent opposed surfaces of the semiconductor layer.

4,422,091

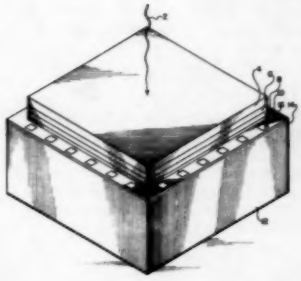
BACKSIDE ILLUMINATED IMAGING CHARGE COUPLED DEVICE

Yet-Zen Liu, Westlake Village, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jan. 19, 1981, Ser. No. 225,899

Int. Cl.³ H01L *29/78*

U.S. Cl. 357—24 **8 Claims**



1. An imaging charge coupled device (CCD) comprising:

a first layer of supporting material;

a second layer of semiconductive material of a first conductivity type having a CCD circuit on one side, said one side being bonded to said first layer;

a third layer of semiconductive material of a second conductivity type epitaxially joined to the other side of said second layer; and

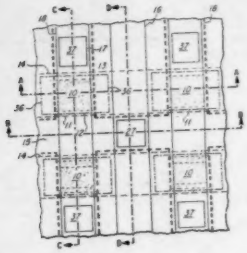
a fourth thin layer of semiconductive material of said second conductivity type epitaxially joined to said third layer, said semiconductive material forming said fourth layer having a wider bandgap than said semiconductive material forming said third layer so that said fourth layer is a window for said third layer;

said imaging CCD not having a substrate, whereby the support for said device is provided by said first layer.

4,422,092
HIGH COUPLING RATIO ELECTRICALLY PROGRAMMABLE ROM

Daniel C. Guterman, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 75,854, Sep. 17, 1979, Pat. No. 4,326,331. This application Feb. 1, 1982, Ser. No. 344,289
Int. Cl.³ H01L *27/02*
U.S. Cl. 357—41 **3 Claims**

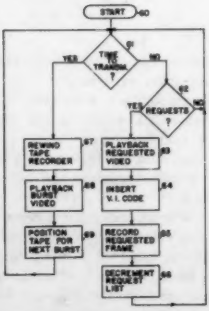


1. A semiconductor device comprising:
a first field oxide on a face of a semiconductor body surrounding an active area of the face,
a plurality of heavily doped regions in said face in said active area, such regions being covered by a second field oxide at said face, such regions being spaced from one another,
a first layer of conductive material overlying said face at said active area forming an electrode located above the space between the heavily doped regions and also overlapping the heavily doped regions by a significant amount, the first layer also extending over the first field oxide by a substantial amount,
a second layer of conductive material on said face overlying the first layer and defining an elongated strip overlying the heavily doped regions, the second layer having opposite edges coinciding with edges of the first layer,
a thin insulator separating the first layer from said face, the first and second field oxides being much thicker than said thin insulator.

4,422,093
TELEVISION BURST SERVICE

Robert W. Pargee, Jr., San Clemente, Calif., assignor to Eeco Incorporated, Santa Ana, Calif.

Continuation of Ser. No. 249,792, Apr. 1, 1981, abandoned. This application Jan. 27, 1983, Ser. No. 461,316
Int. Cl.³ H04N *9/32*
U.S. Cl. 358—12 **8 Claims**

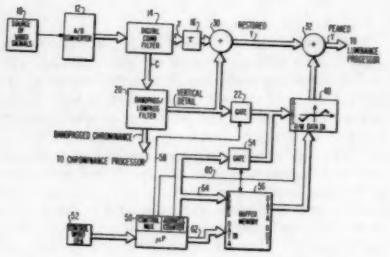


1. The method of distributing for storage and subsequent elective viewing plural dissimilar individually specified complete color images simultaneously to an unlimited number of remote receivers, which includes the method steps of:
(a) forming plural frames of video signal, each of dissimilar specified subject matter,
(b) contiguously storing in a manner allowing reproduction of each successive frame at video speed said frames prior to transmission,
(c) transmitting only once all said contiguously stored frames of video signal in a continuous burst over a wide band communication channel at video speed,
(d) contiguously storing at video speed all said frames of video signal at all remote receivers simultaneously during transmission, and
(e) at any later time upon demand, locating and repeatedly reproducing at the original video speed a selected said frame of specified subject matter from the contiguous storage, after transmission, for viewing.

4,422,094
DIGITAL SIGNAL PROCESSOR WITH SYMMETRICAL TRANSFER CHARACTERISTIC

Henry G. Lewis, Jr., Hamilton Square, N.J., and Alfonse Acampora, Staten Island, N.Y., assignors to RCA Corporation, New York, N.Y.

Filed Nov. 6, 1981, Ser. No. 319,090
Int. Cl.³ H04N *19/535*
U.S. Cl. 358—37 **12 Claims**



1. In a television receiver, including a source of digital video signals of N-bit words, including an Nth most significant bit, and occupying a dynamic range of M signal levels, a digital signal translation circuit comprising:
a digital memory having an address input coupled to receive said digital video signals and an output at which translated video signal components of less than N bits are produced; said digital memory storing a table of digital signals of less than N times M bits; and
means for combining said Nth bit of said digital video signals with said translated video signal components to produce translated digital video output signals occupying a given dynamic range.

4,422,095
VIDEO TONE CONTROL CIRCUIT

Nobukazu Hosoya, Nara, Japan, assignor to Sanyo Electric Co., Ltd., Osaka, Japan

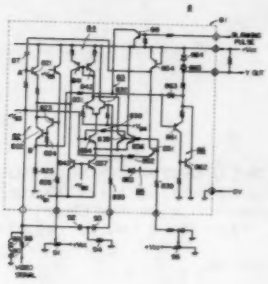
Filed Sep. 3, 1981, Ser. No. 299,118
Claims priority, application Japan, Sep. 8, 1980, 55-124938
Int. Cl.³ H04N *5/14*
U.S. Cl. 358—166 **13 Claims**

1. A video tone control circuit for emphasizing or attenuating a high frequency component in a video signal, comprising:
means for providing a video signal,
direct current bias voltage setting means for variably setting a direct current bias voltage,
first circuit means for receiving said video signal for empha-

sizing a high frequency component in said video signal as a function of said direct current bias voltage,

filter means for receiving said video signal for attenuating a high frequency component in said video signal as a function of said direct current bias voltage,

second circuit means responsive to said direct current bias



voltage for enabling one of said first circuit means and said filter means and for disabling the other, and

output means for outputting any one of said video signal the high frequency component of which has been emphasized by said first circuit means and said video signal the high frequency component of which has been attenuated by said filter means.

4,422,096

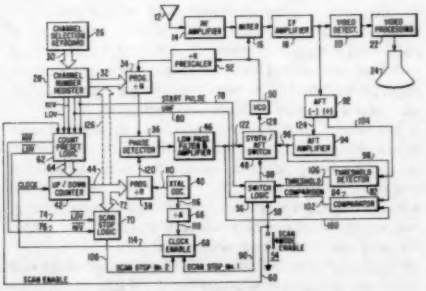
TELEVISION FREQUENCY SYNTHESIZER FOR NONSTANDARD FREQUENCY CARRIERS

John G. N. Henderson, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 632,060, Nov. 14, 1975, abandoned. This application Dec. 16, 1976, Ser. No. 751,924

Int. Cl.³ H04N *5/44, 5/50;* **H04B** *1/26*

U.S. Cl. 358—191.1 **29 Claims**



29. A tuning system for receiving composite RF television signals associated with respective channels, each of said composite RF signals having either a standard frequency carrier or a nonstandard frequency carrier, each of said nonstandard frequency carriers being arbitrarily near a respective one of said standard frequency carriers within a first predetermined range less than the frequency separation between adjacent ones of said channels, comprising:

local oscillator means for generating a local oscillator signal having a frequency controlled in response to a control signal;

first programmable divider means for dividing the frequency of said local oscillator signal by a first programmable factor to generate a first frequency-divided signal;

a source of a relatively stable frequency signal having a substantially lower frequency than said local oscillator signal;

a second programmable divider for dividing the frequency of said stable frequency signal by a second programmable factor to generate a second frequency-divided signal;

phase comparator means for generating said control signal for said local oscillator means in response to at least one of the phase and frequency deviation between said first frequency-divided signal and said second frequency-divided signal;

mixer means for combining said RF signals and said local oscillator signal to generate an IF signal including at least one information bearing carrier;

first control means for controlling said first programmable factor to select one of said channels; and

second control means for controlling the second programmable factor to control the frequency of said information bearing carrier within a second predetermined range determined by said first predetermined range.

4,422,097

AUTOMATIC FOCUS CONTROLLING METHOD

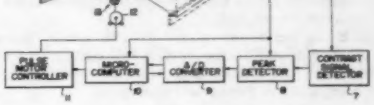
Masafumi Inuiya, Asaka, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 18, 1981, Ser. No. 244,918

Claims priority, application Japan, Mar. 19, 1980, 55-35202

Int. Cl.³ H04N *5/38*

U.S. Cl. 358—227 **2 Claims**



1. An automatic focus controlling method for a system including a lens comprising the steps of moving the lens axially in a first direction, generating a contrast signal from an image pick-up device scanning an image focused by the lens, comparing the maximum/peak contrast signal generated with a previously generated and stored maximum/peak contrast signal, moving said lens in said first direction by a predetermined distance beyond a position at which a maximum/peak contrast signal is generated while continuing to generate the contrast signal to search for another peak, said predetermined distance being established as a distance long enough to encompass lens movement corresponding to a lower contrast signal following an immediately preceding peak- signal, and moving said lens in a second opposite direction if a greater peak signal is not generated in said predetermined distance to a position corresponding to the last maximum/peak signal.

4,422,098

INTERNAL TEST METHOD AND APPARATUS FOR FACSIMILE TRANSCEIVER

James A. Logie, Orlando, and Arthur G. Wilson, Maitland, both of Fla., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

Continuation of Ser. No. 120,488, Feb. 11, 1980. This application Oct. 30, 1981, Ser. No. 316,949

Int. Cl.³ H04N *1/42, 1/02*

U.S. Cl. 358—256 **8 Claims**

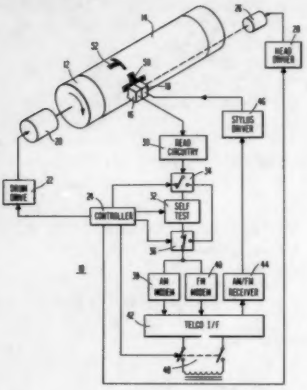
1. A method of self-diagnostic testing a facsimile transceiver with a transmitter means and a receiver means and including a reading means and a writing means closely situated with re-

spect to said reading means, said method comprising the steps of:

positioning a document having a test pattern on a first portion thereof adjacent said reading means;

scanning a part of a single scan line of said document with said reading means said writing means being inactive during said scanning;

selectively switching a memory to the output of said reading means during the period in which said part of said scan line is being scanned;



storing the output of said reading means in said memory;

selectively switching the contents of said memory to said transmitter means the output of which is directed to said receiver means; and

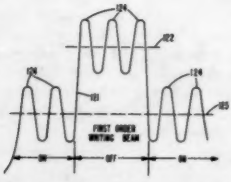
displaying the output of said receiver means on a second portion of said document with said writing means during another part of said single scan line said reading means being inactive during said displaying.

4,422,099

OPTICAL COMMUNICATION ON VARIABLE POWER BEAM

Larry L. Wolfe, Broomfield, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 3, 1982, Ser. No. 345,492
Int. Cl.³ H04N *1/24, 1/30*
U.S. Cl. 358—293 **29 Claims**



1. In a deflection system for selectively deflecting a major portion of a light beam from a zero-order path, feedback apparatus comprising:

light responsive means for providing a signal representative of a characteristic of an applied light beam;

feedback means for applying a feedback representation to an undeflected portion of said light beam of said zero-order path, said feedback representation modulating said characteristic of light beam substantially different from said selective deflection;

means for directing said undeflected portion of said light beam of said zero-order beam to said light responsive means; and

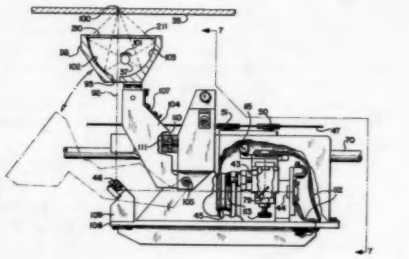
detector means responsive to said representative signal for detecting said feedback representation modulation without detecting said selective deflection.

4,422,100

DOCUMENT SCANNING APPARATUS

Dale R. DuVall, Keller, and Barry C. Kockler, Lewisburg, both of Tex., assignors to The Mead Corporation, Dayton, Ohio

Filed Mar. 8, 1982, Ser. No. 355,411
Int. Cl.³ H04N *1/24*
U.S. Cl. 358—293 **8 Claims**



1. Document scanning apparatus comprising:

a. reflector means including a reflecting surface defining a section of an elliptic cylinder having an enclosed first focal line and a non-enclosed second focal line; said reflecting surface being provided with an elongated slot which extends parallel to said focal lines and which is positioned such that a plane extending along an optical path from said second focal line to said slot makes an acute angle with another plane extending along the major axis of said elliptic cylinder between said focal lines,

b. a line source of illumination mounted in said reflector means along said first focal line to illuminate said reflecting surface and produce an intense line of illumination at said second focal line,

c. document support means for supporting a document along said second focal line so as to be illuminated and reflect rays of image light along said optical path,

d. an arcuate circular cylindrical baffle positioned along said major axis concentric with said first focal line for preventing illumination of said document by direct rays from said line source of illumination and redirecting said direct rays backwardly through said first focal line and toward said reflecting surface; said baffle being positioned in such a manner as to avoid blocking said optical path,

e. lens means for receiving said rays of image light and focussing said rays into an image of said document,

f. a plurality of photodetecting elements arranged along a line for sensing said image and producing electrical representations thereof,

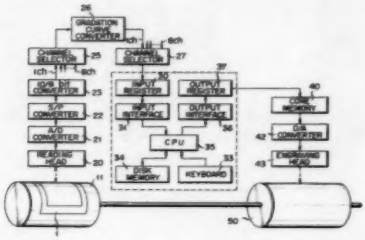
g. carriage means for supporting said reflector means, said baffle, said lens means, and said photodetecting elements, and

h. means for causing relative movement between said carriage means and said document.

4,422,101
ELECTRONIC CYLINDER MAKING METHOD

Masayuki Takei, Ikeda, Japan, assignor to Toppan Printing Co., Ltd., Tokyo, Japan

Filed Jul. 23, 1981, Ser. No. 285,916
Claims priority, application Japan, Jul. 30, 1980, 55-104485; Mar. 9, 1981, 56-33649
Int. Cl.³ H04M 1/22
U.S. Cl. 358—299 12 Claims

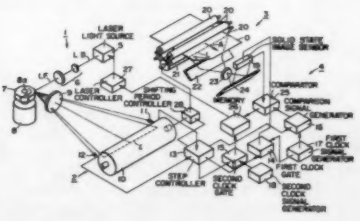


1. An electronic cylinder making method for an endless pattern and/or a multiple pattern which comprises the steps of:
scanning an original on which a main pattern extended at a portion to be continued in a required degree is impressed, thereby producing a density signal;
carrying out an analog-digital conversion of the density signal, thereby providing digital data on the density of the original;
correcting the digital density data obtained by gradually converting data on the density of the extended pattern section into data on the density of the opposite pattern section to the extended pattern section; and
engraving a screened pattern on the surface of a printing cylinder in accordance with the contents of a signal denoting the corrected density.

4,422,102
LASER RECORDING METHOD AND APPARATUS SIMULTANEOUSLY SCANNING AND READING OUT ADJACENT DATA

Yasuyuki Tamura, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 151,685, May 20, 1980, abandoned.
This application Sep. 1, 1982, Ser. No. 413,776
Claims priority, application Japan, May 25, 1979, 54-64801; May 25, 1979, 54-64802
Int. Cl.³ H04N 1/06, 1/40
U.S. Cl. 358—302 6 Claims

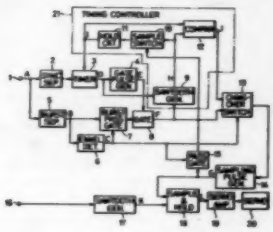


1. A laser recording method in which recording is made on a recording medium with a laser beam modulated in accordance with a signal corresponding to an original to be recorded, comprising the steps of:
reading an original to be recorded line by line in its main scanning direction at a first clock frequency, with original reading means having a photoelectric means, and for each line so read generating a read signal therefrom;
transferring the read signal generated by the reading means to memory means for storage therein;
while said reading means is reading one line on the original, reading out of said memory means as an output signal at a second clock frequency higher than the first clock frequency, the read signal corresponding to the line on the original immediately preceding the one line;
controlling a laserbeam at the second clock frequency in accordance with the output signal thus read out;
scanning with the laser beam by moving a movable reflecting surface wherein the time required for one effective scan is shorter than that required for said original reading means to read one line of the original, said second clock frequency being related to the time required for one effective scan; and
recording the image of the original on the recording medium with the laser beam thus scanned and controlled in a one-to-one magnification relationship.

4,422,103
DEVICE FOR REDUCING THE EFFECT OF TIME BASE VARIATIONS IN VIDEO DISC PLAYER

Hitoshi Kanamaru, Saitama, Japan, assignor to Universal Pioneer Corporation, Tokorozawa, Japan

Filed May 21, 1981, Ser. No. 265,929
Claims priority application Japan, May 28, 1980, 55-71172
Int. Cl.³ H04N 9/44, 1/28, 5/78
U.S. Cl. 358—320 7 Claims



2. A device for eliminating time base variations in a video disc player comprising:
means for reproducing color video signals recorded on a video disc;
means for separating horizontal synchronizing signals from reproduced color video signals;
means for separating color burst signals from said color video signals and means for generating a color burst pulse signal in response to said color burst signals;
means for generating color burst presence signals indicative of periods when said color burst signals are present;
means for generating a gate pulse after a predetermined time from each of said horizontal synchronizing signals;
means responsive to said gate pulse, said color burst presence signal and said color burst pulse signal for generating a time base information pulse which has a width extending from the leading edge of said gate pulse to a predetermined edge of said color burst signals appearing after the leading edge of said gate pulse when said color burst presence signals are present and which has the same width as said gate pulse when said color burst presence signals are absent;
timing control means for generating a timing pulse in response to a sampling pulse and said time base information pulse when said color burst presence signals are present and in response to said sampling pulse alone when said color burst presence signals are absent;
means responsive to said color burst presence signals for generating said sampling pulse in response to said time

base information pulse when said color burst presence signals are present and in response to said timing pulse when said color burst presence signals are absent;

means for generating a reference horizontal synchronizing pulse;

means for generating an error signal in response to said reference horizontal synchronizing pulse and said sampling pulse; and

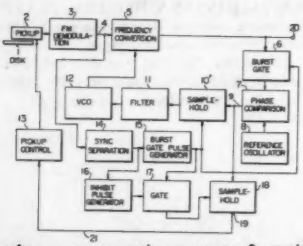
servo means for compensating for time base variations in response to said error signal.

4,422,104

TIME BASE ERROR CORRECTING APPARATUS FOR VIDEO PLAYER

Tooru Fujishima, Yokohama, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 23, 1981, Ser. No. 256,683
Claims priority, application Japan, Apr. 23, 1980, 55-52958
Int. Cl.³ H04N *5/76*
U.S. Cl. 358—322 **20 Claims**



6. A time base error correcting apparatus for a video player comprising pickup means for detecting a color video signal including a color burst signal from a recording medium, first gate means for extracting the color burst signal from the detected color video signal, phase comparison means for comparing a phase of the extracted color burst signal with that of a reference signal and providing a comparison output signal indicative of the comparison, pickup control means for supplying the comparison output signal from the phase comparison means to the pickup means for correcting a relative position of the pickup means and the recording medium, and second gate means for inhibiting the supplying of the comparison output signal from the comparison means occurring at least for a predetermined period of time immediately after a period of time in which the color burst signal disappears in each vertical blanking period to the pickup control means.

4,422,105

INTERACTIVE SYSTEM AND METHOD FOR THE CONTROL OF VIDEO PLAYBACK DEVICES

Dale F. Rodesch, Reno, and Nicholas Cerracchio, Las Vegas, both of Nev., assignors to Video Education, Inc., Reno, Nev.

Continuation-in-part of Ser. No. 83,821, Oct. 11, 1979, abandoned. This application Sep. 30, 1980, Ser. No. 192,227
Int. Cl.³ G09B *9/00*; **G11B** *15/52, 17/24*
U.S. Cl. 358—903 **14 Claims**

1. An interactive video display system comprising, in combination:

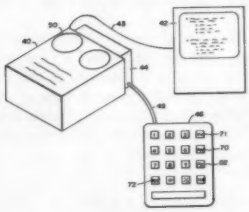
a video playback device adapted to respond to respective ones of a set of input control function commands either to play a prerecorded program medium to recover signal information recorded on a video signal track thereon or to fast reverse or fast forward scan said program medium while recovering medium position information from a control track thereon to produce control track pulse output signals;

a video monitor coupled to said video playback device for receiving video output signals therefrom and producing video displays corresponding thereto;

an input control signal means responsive to system user selected input commands to produce corresponding control signals; and

a microcomputer system including a central processing unit, an operating program memory, a scratch pad memory, and a plurality of programmable input/output devices communicating with said central processor unit (CPU) by way of a system address bus, a system data bus, and a system control signal bus, a control track circuit coupled to said video playback device to receive said control track pulse output signals and being operative to produce a sequence of interrupt signals to said CPU in response thereto, and a data recovery circuit coupled to said video playback device to receive said video output signals therefrom for recovering data words contained therein, a first of said programmable input/output devices being coupled to said video playback device for supplying said input control function commands thereto under CPU-program control, a second of said programmable input/output devices being coupled to said input control signal means to communicate said control signals to said CPU under CPU-program control, and a third of said programmable I/O devices being coupled to said data recovery circuit to communicate data therefrom to said system data bus;

said video display system being adapted to be controlled by program information provided on said prerecorded program medium and comprising a plurality of groups of live video segments and a plurality of data dump segments



with a data identifying signal preceding each data dump segment adapted to be sensed by said data recovery circuit in conjunction with said CPU to enable operation of said data recovery circuit, each of said live video segments being preceded by a data dump segment which includes at least one control word identifying the medium location thereof, and at least one of said data dump segments consisting of a software routine in the form of a prearranged sequence of control words providing a set of branching instructions for said CPU to data dump loctaions associated with selected live video segments and instructions for interpreting a predetermined set of user input commands to operatively select one of said branching instructions, said CPU thereby being responsive to one of said predetermined set of user input commands to produce either a fast reverse or forward scan function command to said video playback device until an approximate medium location corresponding to a new data dump location is reached, using said interrupt signals received from said control track circuit as a guide, followed by a play function command to said video playback device until the data dump associated with the selected branching instruction is encountered on said medium and said live video segment associated therewith is displayed on said monitor.

13. A method of providing random access playback of program segments recorded on one or both of the video and audio tracks of a video tape which also includes a control track having control track signals recorded thereon at regular intervals throughout the length of the tape, using a video tape playback device which is responsive to input function control

signals either to play a video tape or to fast scan said tape in either forward or reverse directions and which includes means for recovering video and audio signals from respective video and audio tracks during said play mode and means for recovering said control track signals from said control track during play and fast scan modes, said method comprising:

recording said program segments at precisely defined predetermined tape locations on said video tape;

recording on said tape as part of each program segment a precise tape location address corresponding to said defined tape location of said program segment;

tracking approximate tape location in a tape location address memory during play and fast scan of said playback device by using control track signals received from said control track to continuously update said tape location address memory to an approximate current tape location address;

supplying a target tape location address corresponding to the target tape location of a different program segment;

supplying function control signals to said playback device to drive said video tape to said target tape location based on the displacement between said target tape location address and said approximate current tape location address;

recovering said precise tape location address as said different program segment is played; and

updating said tape location address memory with the recovered precise tape location address.

4,422,106

MAGNETIC TRANSCRIPTION-RECORDING METHOD

Norikazu Sawazaki, Kawasaki, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

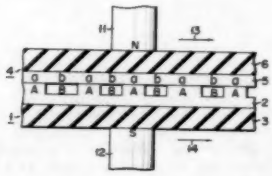
PCT No. PCT/JP80/00153, § 371 Date Jul. 27, 1981, § 102(e) Date Feb. 26, 1981, PCT Pub. No. WO81/00165, PCT Pub. Date Jan. 22, 1981

PCT Filed Jul. 1, 1980, Ser. No. 243,909

Claims priority, application Japan, Jul. 2, 1979, 54-82609; Sep. 13, 1979, 54-116767

Int. Cl.³ G11B *5/86*

U.S. Cl. 360—17 **9 Claims**



1. A magnetic transcription-recording method, in which a magnetic material layer of a magnetic recording mdium is brought into contact with the magnetic material layer of a master recording medium having information signals recorded therein in a pattern of projections, and a magnetic field is applied to the master recording medium and the magnetic recording medium so as to transcribe and record magnetically the information signals in the magnetic material layer of the magnetic recording medium, wherein said magnetic field includes an AC magnetic field and a DC magnetic field, said AC magnetic field is applied in a direction perpendicular to an oriented direction of said magnetic material layer of said magnetic recording medium, and said DC magnetic field is applied in said oriented direction.

4,422,107

TAPE RECORDER CONTROL SYSTEM FOR AUTOMATICALLY REVERSING TAPE

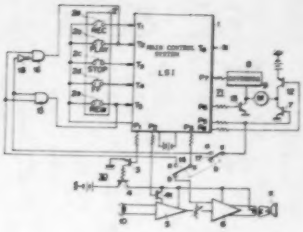
Kazuyasu Motoyama, Hachioji, Japan, assignor to Olympus Optical Company Ltd., Tokyo, Japan

Continuation of Ser. No. 129,236, Mar. 11, 1980, abandoned. This application May 14, 1982, Ser. No. 378,269

Claims priority, application Japan, Mar. 12, 1979, 54-31483

Int. Cl.³ G11B *15/00*

U.S. Cl. 360—62 **4 Claims**



1. For a tape recorder capable of producing a tape-stop signal indicating that tape feed has stopped, a control system, comprising:

a motor for driving reels;

a plurality of switches including a recording switch to actuate a recording function for producing recording input signals, a reproducing switch to actuate a reproducing function for producing reproducing input signals, a stop switch to actuate a stopping function for producing stopping input signals, a fast forward switch to actuate a fast forward tape feed function for producing fast forward input signals, and a rewind switch to actuate a rewind function for producing rewind input signals;

an LSI circuit having a plurality of input terminals each connected to one of said switches for receiving the respective input signals and having an input terminal for receiving tape-stop signals;

said LSI circuit being responsive to the signals at the input terminals for producing recording and reproducing output signals, motor forward and reverse output signals, and tape-stop output signals in response to the tape-stop signals, said LSI circuit having a plurality of output terminals at which respective ones of said output signals appear;

recording and reproducing means responsive to the recording and reproducing output signals for recording and reproducing data;

power switch means coupled to the output terminals and responsive to said motor forward and reverse output signals for supplying power to the motor in response to the motor forward and reverse output signals; and

feedback means outside the LSI circuit and external to the terminals thereof and responsive to the stop-tape output signals and coupled to the input terminal connected to the rewind switch.

4,422,108

TAPE RECORDER

Tohru Sampei; Naoya Fujita; Shigemitsu Higuchi; Masamichi Yamada, all of Yokohoma, and Kouichi Tomatsuri, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 66,652, Aug. 15, 1979. This application Jun. 1, 1982, Ser. No. 383,958

Claims priority, application Japan, Aug. 16, 1978, 53-99024; Aug. 16, 1978, 53-99025; Sep. 28, 1978, 53-117922; Sep. 28, 1978, 53-117943

Int. Cl.³ G11B *5/45, 5/47*

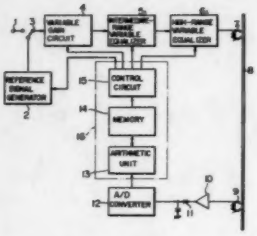
U.S. Cl. 360—65 **11 Claims**

1. A tape recorder including means for recording a signal

through a signal recording path onto a magnetic tape and means for reproducing the signal recorded on said magnetic tape, comprising:

(a) a variable gain circuit inserted in the signal recording path for compensating the sound recording sensitivity of the magnetic tape;

(b) a first variable equalizer inserted in the signal recording path for compensating the frequency characteristic of the magnetic tape in the intermediate frequency range;



(c) a second variable equalizer inserted in the signal recording path for compensating the frequency characteristic of the magnetic tape in the high frequency range;

(d) a reference signal generator respectively supplying reference signals at different frequencies to said signal recording path; and

(e) control means for controlling said variable gain circuit, said first variable equalizer and said second variable equalizer based on the output of said reproducing means.

4,422,109

MAGNETIC RECORDING AND REPRODUCING APPARATUS AUTOMATICALLY ADJUSTABLE TO EACH INDIVIDUAL MAGNETIC TAPE

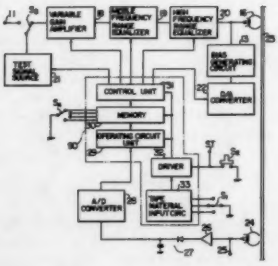
Tohru Sampei; Naoya Fujita; Shigemitsu Higuchi; Masamichi Yamada, all of Yokohama, and Kohichi Tomatsuri, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 79,162, Sep. 26, 1979. This application Jun. 22, 1982, Ser. No. 390,884

Claims priority, application Japan, Sep. 27, 1978, 53-117901; Sep. 27, 1978, 53-117902; Sep. 27, 1978, 53-117928; Sep. 27, 1978, 53-117932

Int. Cl.³ G11B *5/45, 5/47*

U.S. Cl. 360—65 **39 Claims**



1. A magnetic recording and reproducing apparatus automatically adjustable to each individual magnetic tape, comprising:

a source for producing a plurality of test signals at different frequencies;

a variable gain amplifier controlled by a gain control signal for amplifying said test signals, said amplifier normally serving to amplify a recording signal;

equalizer means controlled by a frequency response control signal for equalizing said test signals, said equalizer means normally serving to equalize said recording signal;

a recording bias generating circuit controlled by a bias control signal for generating a recording bias;

a recording transducer for recording said test signals on the magnetic tape, said recording transducer normally serving to record said recording signal;

a reproducing transducer for reproducing said test signals recorded on the magnetic tape, said reproducing transducer normally serving to reproduce said recording signal;

a memory for storing at least a reference value;

operating means for calculating said gain control signal, said frequency response control signal and said bias control signal by using said reference value and outputs of said reproducing transducer for said test signals reproduced from the magnetic tape; and

control means for supplying said gain control signal, said frequency response control signal and said bias control signal to said variable gain amplifier, said equalizer means and said recording bias generating circuit, respectively.

4,422,110

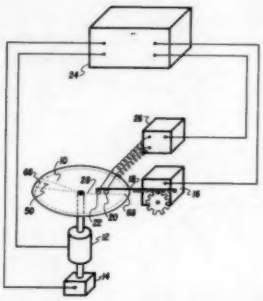
METHOD AND APPARATUS FOR MULTI-TRACK DATA TRANSLATION ON A DISC

Robert S. Reynolds, Boise, Id., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 25, 1981, Ser. No. 296,083

Int. Cl.³ G11B *19/02, 21/08*

U.S. Cl. 360—69 **6 Claims**



1. Data translating apparatus having a plurality of translating modes comprising:

a memory disc having a plurality of concentric circular tracks for storing data representations at a plurality of locations along the tracks;

a disc drive means, coupled to the disc, for rotating the disc at a predetermined constant angular velocity;

a sensing means coupled to the disc drive means to produce signals representing disc angular position and speed;

an actuator arm;

a positioning means, coupled to the actuator arm, for positioning the actuator arm radially on the disc;

at least two transducer means mounted on the actuator arm for translating data representations onto the disc at a plurality of locations along the tracks;

a mode selecting means, coupled to the sensing means and the transducer means, for selecting a plurality of translating modes including a first and second translating mode in response to signals representing disc angular position and speed and as a function of track radius, said first mode being the translation of data representations onto one

track, and said second mode being the translation of the same quantity of data representations alternately onto a selected number of tracks in a predetermined repetitive sequence as is translated onto one track in the first mode.

4,422,111

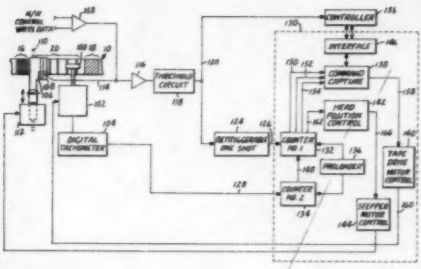
HIGH CAPACITY DATA CARTRIDGE SYSTEM AND PREFORMATTED CARTRIDGE FOR USE THEREIN

Gary D. Moeller, Maplewood, and Robert E. Wolff, Edina, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 72,229, Sep. 4, 1979, abandoned. This application Aug. 20, 1981, Ser. No. 294,435

Int. Cl.³ G11B *5/09, 15/18*

U.S. Cl. 360—72.1 **30 Claims**



1. A digital data cartridge comprising a housing and magnetic recording tape movable along a transport path therein, said tape having a plurality of prerecorded, longitudinally-readable, different digital key patterns of equal length, each extending uniformly across the entire width of the tape and separated from each other by record locations of greater equal length, each key pattern uniquely identifying an adjacent record location.

4,422,112

MAGNETIC RECORDING AND REPRODUCING APPARATUS

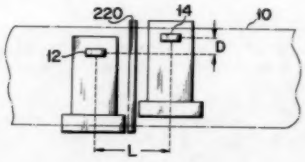
Shigeo Tanaka, Kawasaki, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Jun. 9, 1981, Ser. No. 271,932

Claims priority, application Japan, Jun. 13, 1980, 55-79794

Int. Cl.³ G11B *21/24, 21/08*

U.S. Cl. 360—77 **15 Claims**



1. A magnetic recording and reproducing apparatus comprising:

a recording head for recording a signal on a recording medium on which a plurality of tracks are provided along the direction in which the recording head and the recording medium are relatively moved;

a reproducing head for reproducing a signal;

support means for supporting said recording head and said reproducing head to establish a predetermined separation distance therebetween;

head moving means for moving at least one of said recording head and said reproducing head in a direction perpendicular to the track to change said separation distance therebetween; and

drive means operatively connected to said support means for driving said support means in a direction perpendicular to said tracks while maintaining said separation distance between said recording head and said reproducing head.

4,422,113

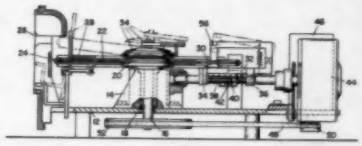
STEPPING MOTOR DRIVE SYSTEM

Stuart P. Mabon, Los Angeles, Calif., assignor to Microcpolis Corporation, Chatsworth, Calif.

Filed May 12, 1981, Ser. No. 263,039

Int. Cl.³ G11B *21/08*

U.S. Cl. 360—78 **15 Claims**



1. In a high speed, low-cost, high precision memory system, drive means including a four phase permanent magnet stepper motor having two sections for shifting the position of a magnetic head between storage tracks on a memory surface, said stepper motor having a stator and a rotor;

means for energizing one section and only one section of said stepper motor to hold said rotor in a fixed position relative to said stator;

means for energizing two motive phases of said four phase stepper motor in the other section to operate said motor in the mode of a two phase brushless direct current motor during high speed rotation of said rotor;

means for sensing the relative position of the stator and rotor of said stepper motor from said one section of said motor; and

means for controlling the two phase energization of said motor from said sensing means during high speed rotation of said motor.

4,422,114

CASSETTE TAPE PLAYER

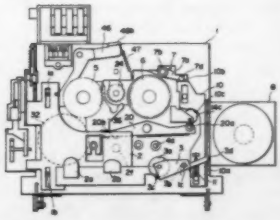
Masanori Sugihara, Kawagoe, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jun. 16, 1981, Ser. No. 274,149

Claims priority, application Japan, Jun. 20, 1980, 55-82772; Jun. 20, 1980, 55-82773; Jun. 20, 1980, 55-82775

Int. Cl.³ G11B *15/26, 15/48*

U.S. Cl. 360—96.4 **8 Claims**



1. A tape player for recording and reproducing sound comprising

a feed reel and a take-up reel

a capstan;

a first motor adapted to provide a first driving force;

first gearing means for transmitting said first driving force both to said take-up reel and said capstan;

a second motor adapted to provide a second driving force;

second gearing means for transmitting said second driving force selectively to one of the take-up reel and feed reel at high speed for fast forwarding or fast rewinding of the tape.

4,422,115

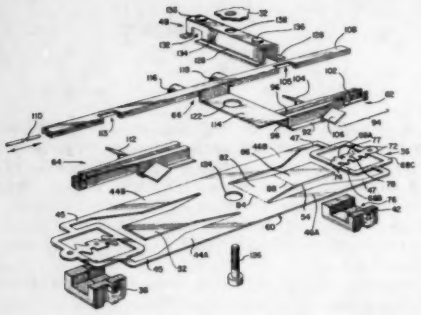
LIGHTWEIGHT DUAL HEAD SUPPORT ASSEMBLY FOR MAGNETIC DISK DRIVES

John L. Spash, Harvard, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Continuation of Ser. No. 126,020, Feb. 29, 1980, abandoned. This application Jul. 14, 1981, Ser. No. 283,163

Int. Cl.³ G11B 5/48, 21/16

U.S. Cl. 360—104 3 Claims



1. In a disk drive mass storage unit of the type having at least a pair of read/write heads and a slider member associated with each head for creating an air bearing to support the head when the head is stationed over the surface over a rotating storage disk, each head and associated slider forming a head/slider assembly, and a head positioning arm member adapted to move the head slider assemblies accross the surface of the disk, the improvement comprising:

head suspending means for suspendingly supporting each head from a common point on the arm member, in cantilevered fashion, with one head disposed on each side of the longitudinal axis of the arm member;

the head suspending member means including a unitary flexure member adapted to be secured to the arm member proximate the middle of the flexure member, the flexure member further having first and second ends distal the middle of the flexture, and, at each of such ends a slider frame adapted to support a head/slider assembly and further including, for each head/slider assembly, means for applying a pre-load force thereto;

the means for applying a pre-load force including, for each head/slider assembly, a resilient spring member and means for transferring a force from the spring to the head/slider assembly;

a channel-shaped member running the length of the flexure member along one side thereof and adapted to receive a stiff, elongate wire or needle therein;

the force-transferring means associated with each head/slider assembly including a ramp member depending toward the channel-shaped member;

the channel-shaped member having a cut-away portion adapted to receive the ramp from the forced-transferring means;

a stiff, elongate wire adapted to be inserted in the channel member from one end thereof; and

the ramp members being adapted to ride up over the elongate wire when the wire is inserted into the channel member from one end thereof, to remove the pre-load force from the head/slider assemblies.

4,422,116

DEVICE FOR ADJUSTING SOUND HEAD PLATFORMS

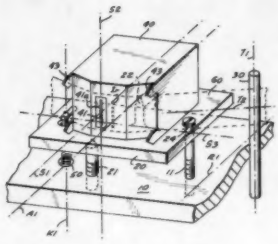
Heinrich Cap, St. Georgen-Peterzell, Fed. Rep. of Germany, assignor to Papst Motoren GmbH & Co. KG, St. Georgen, Fed. Rep. of Germany

Filed Jul. 24, 1981, Ser. No. 286,550

Claims priority, application Fed. Rep. of Germany, Jul. 30, 1980, 3028856

Int. Cl.³ G11B 5/56

U.S. Cl. 360—109 5 Claims



1. Device for adjusting a sound head platform with respect to a transport shaft in sound recorders, cassette sound recorders or digital data storage apparatus which include a transport shaft, a sound head platform for supporting a sound head having a main axis and a support for supporting the sound head platform, comprising a pivot bearing and a knife edge bearing mounted on said support; said pivot bearing and said knife edge bearing extending through a bearing axis which lies parallel to said main axis and beneath thereof, said bearing axis extending in a plane radial to the transport shaft, the sound head platform being supported on said pivot bearing and said knife edge bearing; a spring extended normal to the sound head platform and adapted to push the sound head platform against the pivot bearing and the knife edge bearing; and a counter bearing on which the sound head platform is supported, said counter bearing being mounted on said support and extended at a distance from said bearing axis towards said transport shaft, said spring rotating said sound head platform about said bearing axis until it is pushed against said counter bearing.

4,422,117

THIN FILM MAGNETIC HEAD AND METHOD OF MAKING IT

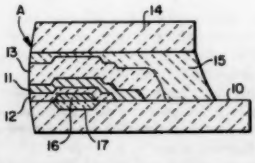
Noboru Nomura, Kyoto; Kenji Kanai, Neyagawa; Nobuyuki Kaminaka, Moriguchi, and Norimoto Nouchi, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Apr. 16, 1981, Ser. No. 254,662

Claims priority, application Japan, Apr. 11, 1980, 55-95392; Apr. 17, 1980, 55-51211; May 7, 1980, 55-60880

Int. Cl.³ G11B 5/12, 5/20, 5/22

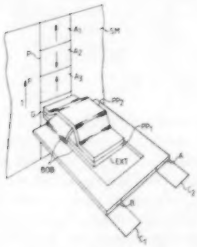
U.S. Cl. 360—126 10 Claims



1. A thin film magnetic head comprising:

a substrate;
thin film layers deposited on said substrate and including components of an electromagnetic transducing means, one of which is a magnetic layer;
a wear resistant layer on said thin film layers;
a protector plate means for covering the thin film layers; and
a bonding layer bonding said protector plate means to said wear resistant layer, said bonding layer being a glass having a working temperature no higher than the highest temperature at which the magnetic properties of said magnetic layer are substantially retained and having a thickness less than 50 μm.

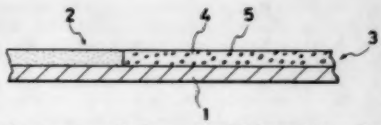
4,422,118
INTEGRATED MAGNETIC TRANSDUCER
Michel Helle, Marcq, and Jacques Desserre, Rambouillet, both of France, assignors to Compagnie Internationale pour l'Informatique, France
Filed Jun. 15, 1981, Ser. No. 273,617
Claims priority, application France, Aug. 27, 1980, 80 18599
Int. Cl.³ G11B *5/16, 5/14, 5/20*
U.S. Cl. 360—126 **9 Claims**



1. An integrated magnetic transducer for reading magnetic information recorded on a magnetic support adapted to be driven before it comprising:
a magnetic circuit formed of two pole pieces (PPI_1, PPI_2) separated by a gap (GI) parallel to the support (SM) and having a large dimension (Lpm) perpendicular to the direction of movement of the support;
means (BOBI) coupled magnetically to this circuit, for transformation of magnetic flux of loss of information into an electric signal, the pole pieces (PPI_1, PPI_2) each comprising at the level of the gap (GI), a central part (PCI_1, PPI_2) bounded by two lateral parts (PLI_1 - PLI_2, PLI_3 - PLI_4) and spaced from such other such that the magnetic coupling between the central parts (PCI_1, PCI_2), at the level of the gap, is substantially less than the magnetic coupling between the corresponding lateral parts of the pole pieces (PLI_1-PLI_3, PLI_2-PLI_4).

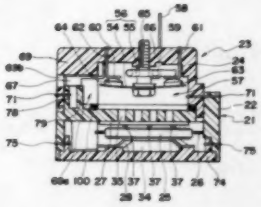
4,422,119
LEADER TAPE
Yoshio Kawakami; Masatoshi Okamura; Haruo Shiba, and Hideki Hotsuki, all of 13-1, Nihonbashi 1-chome, Chuo-ku, Tokyo, Japan
Filed Jul. 22, 1981, Ser. No. 285,835
Claims priority, application Japan, Jul. 28, 1980, 55-105688[U]
Int. Cl.³ G11B *5/41*
U.S. Cl. 360—128 **9 Claims**

1. A leader tape for magnetic recording tape, which comprises a plastic base film and a coating film thereon, said coating film consisting essentially of a mixture of a polymeric binder, inorganic powder particles having a Mohs' hardness of



5 or above in an amount of not more than 5% by weight on the basis of the binder weight and an antistatic agent.

4,422,120
COMBINATION STARTER-PROTECTOR DEVICE
Takashi Kobayashi; Takashi Shikama, both of Yokaichi; Tomoyuki Yamamoto, Ohmihachiman, and Atsuo Yokota, Yokaichi, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan
Filed Oct. 9, 1981, Ser. No. 310,122
Claims priority, application Japan, Oct. 13, 1980, 55-146248[U]; Oct. 23, 1980, 55-151364[U]; Nov. 4, 1980, 55-158262[U]; Nov. 4, 1980, 55-158264[U]
Int. Cl.³ H02H *7/08*
U.S. Cl. 361—24 **9 Claims**



1. A combination starter-protector device for a winding circuit of a single phase induction motor adapted to be energized from an electrical power source, which device comprises:
a housing structure having separate starter and protector compartments separated by a perforated wall interposed therebetween, the housing structure including at least a first outer surface area facing in a first direction and a second outer surface area facing in a second direction, different than said first direction;
a PTC thermistor housed within the starter compartment and having a pair of opposite electrodes;
a bimetal switch housed within the protector compartment and including a bimetallic element and a pair of spaced contacts rigidly carried by the housing structure in face-to-face relationship with and operatively engaging the bimetallic element, said bimetallic element being capable of assuming a circuit interrupting position, in which said bimetal switch is opened, and a circuit completing position in which said bimetal switch is closed;
a first terminal means carried by the housing structure and having a pair of opposite ends, one of the ends of said first terminal means being formed by a tab-on terminal and being exposed to the outside of the housing structure and the other of said opposite ends being connected to one of the spaced contacts;
a second terminal means carried by the housing structure and having a pair of opposite ends, one of the ends of said second terminal means being formed by a socket and being exposed to the outside of the housing structure and the other of said opposite ends being connected to the other of the spaced contacts;
a third terminal means carried by the housing structure and

having a pair of opposite ends, one of said opposite ends of said third teminal means being formed by a tab-on terminal and being exposed to the outside of the housing structure and the other of said opposite ends being connected to one of the opposite electrodes of the thermistor;

a fourth terminal means carried by the housing structure and having a pair of opposite ends, one of said opposite ends of said fourth terminal means being formed by a socket and being exposed to the outside of the housing structure and the other of said opposite ends being connected to said one of the opposite electrodes of the thermistor;

a fifth terminal means carried by the housing structure and having a pair of opposite ends, one of said opposite ends of said fifth terminal means being formed by a tab-on terminal and being exposed to the outside of the housing structure and the other of said opposite ends being connected to the other of the opposite electrodes of the thermistor; and

a sixth terminal means having a pair of opposite ends exposed to the outside of the housing structure, one of said opposite ends of said sixth terminal means being formed by a tab-on terminal, another of said opposite ends of said sixth therminal means being formed by a socket, said sockets being oriented in a first direction extending through said first surface area of said housing structure, said tab-on terminals being oriented in a second direction extending through said second surface area of said housing structure.

4,422,121

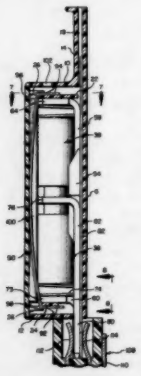
LINE PROTECTOR FOR A COMMUNICATIONS CIRCUIT

Bertram W. Baumbach, Arlington Heights, Ill., assignor to Reliance Electric Company, Cleveland, Ohio

Filed May 28, 1982, Ser. No. 383,278

Int. Cl.³ H02H 9/06

U.S. Cl. 361—119 **6 Claims**



1. A line protector for a communications circuit comprising a dielectric elongated housing open at one side for receiving the components of the protector, said housing having means interior thereof for supporting first and second surge voltage arresters in substantially coaxial relationship with the longitudinal axis of the housing, a first line terminal electrically connected to one arrester, a second line terminal electrically connected to the other arrester, the first line terminal extending from one end of the housing the full length of both arresters and to the other end of the housing, the second line terminal being substantially at said other end of the housing, a ground terminal connected to both arresters intermediate the ends of the housing and extending along only one of the two arresters to said other end of the housing, pins on each of said terminals projecting from said other housing end, a cover over said opening, and a test contact in electrically conductive connection with said second line terminal and extending therefrom to a region at said one housing end, said housing having means at said one end for access to said first line terminal and said test contact by a test probe.

4,422,122

SURGE ABSORBER

Ikuo Nagasawa, and Takashi Ishii, both of Yokosuka, Japan, assignors to Fuji Electric Co., Ltd., Kawasaki, Japan

Filed Feb. 3, 1982, Ser. No. 345,314

Claims priority, application Japan, Feb. 19, 1981, 56-22598; Feb. 19, 1981, 56-22599

Int. Cl.³ H02H 3/22

U.S. Cl. 361—127 **4 Claims**

1. A surge absorber comprising a lead wire connected to one of two electrodes provided on both surfaces of a voltage nonlinear resistive element, and a terminal plate comprising a dish-shaped metal vessel having a surrounding wall, a center recessed portion and a planar peripheral brim surrounding said center recessed portion, wherein said resistive element is secured to the bottom surface of said metal vessel by one of said electrodes, wherein said lead wire is connected to the other electrode of said resistive element, and is insulated from, and passes through, the surrounding wall of said center recessed portion, wherein a resin coating layer is filled in said recessed portion to cover said resistive element and to be generally co-planar with the surface of said peripheral brim, and wherein at least two fitting holes are formed in a part of the brim for mounting the absorber to a supporting body.

4,422,123

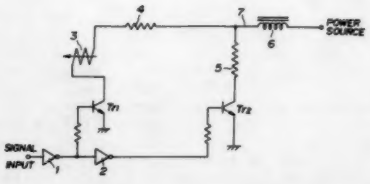
CIRCUIT FOR DRIVING SOLENOID AT HIGH SPEED WITH CHOKE COIL

Noboru Tominari, and Shuichi Kamiyama, both of Tokyo, Japan, assignors to Mikuni Kogyo Co., Ltd., Tokyo, Japan

Filed Jan. 28, 1982, Ser. No. 343,705

Int. Cl.³ H01H 47/22

U.S. Cl. 361—152 **5 Claims**



1. A circuit for driving a solenoid at a high speed with a choke coil comprising:

a pair of switching circuit means alternately turned ON and OFF by a switching element,

a first solenoid coil connected to one of said switching circuit means,

a second solenoid coil defining a resistance element connected to the other of said switching circuit means, and

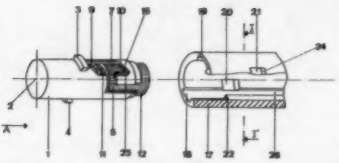
said two circuit means being connected in parallel with a powerline having said choke coil.

4,422,124

PUSH-BUTTON AND PERCUSSION TYPE PIEZOELECTRIC IGNITER

Jacques S. Challet, Cesux d'Allegre, France, assignor to R. V. Constructions Electriques, France

Filed Jan. 22, 1982, Ser. No. 341,616
Claims priority, application France, Jan. 23, 1981, 81 01420
Int. Cl.³ H04R *17/00*
U.S. Cl. 361—260 **4 Claims**



1. A push-button and percussion type piezoelectric igniter, consisting of:

a cylindrical pushbutton body (1) comprising:

(a) two diametrically opposite longitudinal parallel slots (5–6) joining two openings (7) wherein are provided two opposite parallel inclines (9–10),

(b) two diametrically opposite stubs (3–4) located at the tip of each of the two inclines (9–10);

a percussion mass (12) comprising two diametrically opposite stubs (15–16) displaceable on one of the inclines (10) on the body of the push-button (1), which inclines are arranged perpendicularly to, but slightly offset from, the stubs (3–4) of the push-button (1);

a spring (11) resting inside the body of the push-button (1) and on the percussion mass (12) respectively, for propelling said mass (12);

a casing (17) for receiving at one end the assembly comprising push-button (1), spring (11) and percussion mass (12), and at its other end the impact assembly comprising a striker (30), piezoelectric crystal (31), anvil (32), connection (33) and locking part (34), said casing (17) comprising:

(a) on its inside surface two diametrically opposite longitudinal grooves (18–19–26) whose widths correspond to the widths of the stubs (3–4) of the push-button (1), and

(b) two diametrically opposite apertures (20–21) slightly offset from said grooves receiving the stubs (15–16) of the percussion mass (12), said apertures (20–21) being tangential to the longitudinal grooves (18–19) inside the casing (17).

4,422,125

PRESSURE TRANSDUCER WITH AN INVARIABLE REFERENCE CAPACITOR

Frank J. Antonazzi, and David H. Ohnesorge, both of South Bend, Ind., assignors to The Bendix Corporation, Southfield, Mich.

Filed May 21, 1982, Ser. No. 380,647
Int. Cl.³ H01G *7/00*
U.S. Cl. 361—283 **7 Claims**

1. A pressure transducer with an invariable reference capacitor comprising:

a first substrate of insulative material and a second substrate of insulative material;

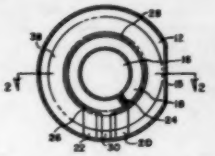
wherein at least one substrate is flexible and will deform in response to a pressure change;

wherein said substrates are positioned to oppose each other across a gap;

an annular frit joining said substrates and forming a chamber between them by sealing said gap to a reference pressure, said annular frit comprising an insulative material with a dielectric constant in excess of one;

at least one sensing capacitor plate formed of a conductive material disposed on one of the substrates and located entirely within the area defined by said chamber;

at least one reference capacitor plate formed of a conductive material disposed on said one substrate and located entirely within the annular area defined by the frit;



at least one common plate formed of a conductive material disposed on said other substrate and opposing said sensing plate in the area defined by said chamber to provide a sensing capacitance between said one common plate and said sensing plate; and

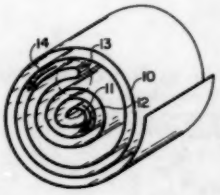
another common plate formed of a conductive material disposed on said other substrate and opposing said reference plate in the area defined by the frit annulus to provide a reference capacitance between said other common plate and said reference plate.

4,422,126

NONINDUCTIVE ELECTRICAL CAPACITOR

Stephen A. James, Hennepin County, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jul. 14, 1982, Ser. No. 398,180
Int. Cl.³ H01G *4/08, 13/00*
U.S. Cl. 361—323 **5 Claims**



4. A convolutely wound electrical capacitor having alternate laminae of dielectric and conductive material, the laminae being folded and the direction of winding reversed when about half the desired length has been wound.

4,422,127

SUBSTANTIALLY SMALL SIZED WOUND CAPACITOR AND MANUFACTURING METHOD THEREFOR

Bernard Lavene, Ocean, N.J., assignor to Electronic Concepts, Inc., Eatontown, N.J.

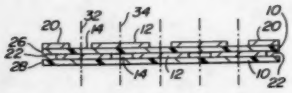
Division of Ser. No. 330,867, Dec. 15, 1981, Pat. No. 4,378,620, which is a continuation of Ser. No. 108,593, Dec. 31, 1979, abandoned. This application Mar. 31, 1983, Ser. No. 480,759
Int. Cl.³ H01G *1/14*
U.S. Cl. 361—323 **3 Claims**

1. A substantially small sized capacitor which comprises:

(a) a wound layered substantially rectangular coil compris-

ing a first dielectric web, said web having a plurality of continuous regularly spaced metallic electrodes deposited on one side of said web, said electrodes being parallel to the lengthwise dimension of said web and further being separated by a plurality of regularly spaced unplated openings, the entire arrangement being disposed so that the first of said electrodes lies along one edge of said web and the last of said electrodes lies along the other edge of said web,

a second web of dielectric material having a plurality of continuous regularly spaced metallic electrodes deposited on one side of said web, said electrodes being spaced parallel to the lengthwise dimension of said web and further separated by a plurality of regularly spaced unplated openings, the entire arrangement being disposed so that the first of said openings lies along one edge of said second web and the last of said web openings lies along the other edge of said second web,



said rectangular coil formed by mating said first web and said second web so that the unplated side of said first web is in physical contact with the plated side of said second web and arranged so that the first of said electrodes and the last of said electrodes on said first web lie over the first of said openings and the last of said openings on said second web, respectively, said webs wound to form a layered cylindrical coil, said cylindrical coil thereafter flattened to a substantially rectangular layered coils, then tempered without the addition of any separate adhesive, and then chopped to form a plurality of individual capacitors of wound continuous electrodes of the small size of ceramic capacitors on the order of $0.090 \times 0.190 \times 0.190$, and

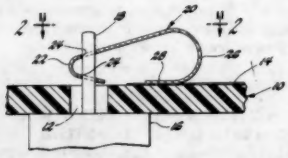
(b) conductors attached to ends of said small sized capacitor by plating metal onto said ends and then attaching said conductors so that contact is made with each of the electrodes lying at said ends.

4,422,128

PUSH-ON TERMINAL CLIP AND ASSEMBLY

Donald B. Zurlinden, Goleta, and Reginald C. Heltmach, Jr., Santa Ynez, both of Calif., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 6, 1981, Ser. No. 290,692
Int. Cl.³ H05K *1/18*
U.S. Cl. 361—408 **3 Claims**



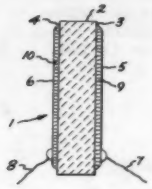
1. An electrical connector for resiliently connecting a component lead to a circuit board conductor comprising a push-on clip formed of conductive spring material, the clip having lead gripping means including a substantially U-shaped end with divergent legs and a lead receiving aperture in each of the legs whereby the clip is adapted by spring action to securely grip a lead inserted through both apertures, and one of the legs having a resilient portion extending from its aperture to terminal means for pressing flush against the circuit board conductor.

4,422,129

HUMIDITY SENSOR

Jacqueline L. Briant, and Jeffrey A. Asher, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 19, 1982, Ser. No. 409,767
Int. Cl.³ H01G *9/00*
U.S. Cl. 361—433 **10 Claims**



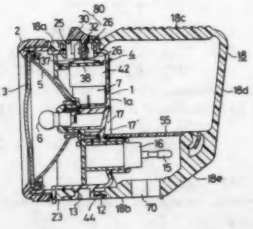
1. A humidity sensor which varies in electrical impedance with variations in humidity in the atmosphere, vacuum or partial vacuum in which it is placed consisting essentially of a ceramic body ranging in thickness from about 100 microns to about 2 centimeters, at least a pair of spaced electrodes disposed on said ceramic body in electrical contact therewith, and an electrical contact on each said electrode, said ceramic body being an electrolyte comprised of $Na_{1+x}Si_xZr_2P_{3-x}O_{12}$, where x has a value ranging from about 1.5 to about 2.8, said ceramic body having a density ranging from about 90% to about 100% of the theoretical density for said $Na_{1+x}Si_xZr_2P_{3-x}O_{12}$, each said electrode having a minimum thickness of about 10 Å and being in the form of a continuous interconnecting network which forms at least a sufficient plurality of non-linear recesses with the surface of the ceramic body which expose ceramic body surface to said atmosphere, vacuum or partial vacuum and produce a measurable electrical current impedance change when said atmosphere, vacuum or partial vacuum varies in relative humidity, said electrodes extending over from about 3% to about 95% of the surface of said ceramic body.

4,422,130

PORTABLE RECHARGEABLE LIGHTING DEVICE

Nomura Shigeo, Sumoto, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Apr. 28, 1981, Ser. No. 258,544
Claims priority, application Japan, May 14, 1980, 55-64249
Int. Cl.³ F21L *9/00, 7/00, 15/00*
U.S. Cl. 362—183 **14 Claims**



1. A portable rechargeable lighting device comprising:
a body including a light bulb and a rechargeable battery;

switch means for switchably coupling said light bulb to said battery;

charging plug for receiving electric current for charging said battery; and

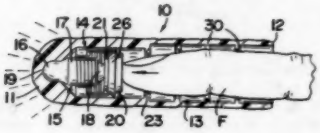
a handle swingably coupled to said body positionable in a lighting position and a charging position, said handle covering said charging plug when in said lighting position.

4,422,131

FINGER LIGHT

Richard A. Clanton, Seminole, and Raymond W. Simmons, Pinellas Park, both of Fla., assignors to Concept P.R. Inc., Clearwater, Fla.

Filed Sep. 7, 1982, Ser. No. 415,324
Int. Cl.³ F21L *7/00*
U.S. Cl. 362—186 **4 Claims**



1. A light comprising: a flexible, molded, one-piece housing having a closed end and an open end, said housing having a translucent section at least in an area adjacent said closed end; a light source in said housing comprising a bulb, a battery and means for biasing said bulb and battery apart, said bulb having a glass dome, a metal base and a contact, said glass dome being positioned adjacent the closed end of said housing and said contact facing said open end; said battery being normally spaced from said bulb in a direction toward said open end and having a first terminal facing in the direction of said contact and an opposite terminal facing said open end, said battery being securely held within said housing by an inwardly directed flange molded integral with said housing at a location intermediate its closed and open ends; said biasing means being an electrically conductive spring which makes contact with said metal base of said bulb and with said opposite terminal of said battery to thereby complete the circuit when said first terminal touches said contact of said bulb; said housing being substantially hollow between said flange and said open end and adapted to receive a human finger so that said light may be worn as an extension of said finger and pressure of said finger through said flange against said battery may effect activation of said light source.

4,422,132

FLUORESCENT-TYPE FIXTURE HAVING IMPROVED FOLD-OUT LAMP SOCKET ASSEMBLIES

Charles A. Trowbridge, Wrightstown, Pa., assignor to Sim Kar Lighting Fixture Co., Inc., Philadelphia, Pa.

Filed Dec. 14, 1981, Ser. No. 330,390
Int. Cl.³ F21V *19/02*
U.S. Cl. 362—220 **9 Claims**

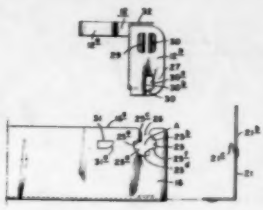
1. In a lighting fixture having a channel member with a web and a pair of upstanding sidewalls terminating in edges and at least one fold-out socket assembly carried by said channel member, and means mounting said socket assembly to pivot from a folded-in shipping position to a folded-out usage position, the improvement wherein said mounting means includes:

a shaped aperture located in each of said sidewalls and aligned with one another to provide a pivot axis for said socket assembly,

means in each sidewall providing a slot connecting said shaped aperture with an edge of the sidewall, and

a pair of ears struck outwardly from the socket assembly,

said aperture and slot being sized relative to said ears to enable said socket assembly to be displaced into said channel when said ears are aligned with said slot and being sized to prevent disengagement of said socket assembly from said channel after said socket assembly has been pivoted into its folded out usage configuration, and



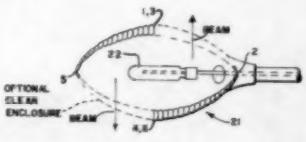
latch means on said sidewalls and socket assembly cooperating to lock said socket assembly when said socket assembly is pivoted into said folded-out usage position.

4,422,133

ILLUMINATING DEVICE WITH REFLECTOR PORTIONS AND VOIDS OPPOSITE THEREOF

William B. Elmer, 2 Chestnut St., Andover, Mass. 01810

Filed Nov. 9, 1981, Ser. No. 319,251
Int. Cl.³ F21V *7/10*
U.S. Cl. 362—277 **6 Claims**



1. Lighting apparatus for producing at least two major beams of light in substantially different directions comprising,

reflecting means having depending first and second side portions on opposite sides of the reflecting means lengthwise axis for reflecting light from a source therein,

means for supporting a light source within said reflecting means so that said reflecting means may direct light energy from said light source into said at least first and second major beams of light in substantially different first and second directions respectively after reflection from said first and second side portions respectively,

said reflecting means being formed with said first and second side portions being relatively displaced in a direction generally parallel to said lengthwise axis to create voids allowing each of said first and second major beams to bypass each other after reflection from said first and second side portions respectively and emerge from said reflecting means through said voids beside said second and first side portions respectively.

4,422,134

LUMINAIRE WITH IMPROVED ILLUMINATION OF A VISUAL TASK FIELD

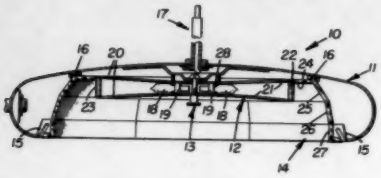
John R. Brass, San Rafael, Calif., assignor to Metropolitan Furniture Corp., San Francisco, Calif.

Filed Jun. 22, 1981, Ser. No. 276,043
Int. Cl.³ F21V *7/00*
U.S. Cl. 362—300 **21 Claims**

1. A luminaire of the direct lighting type adapted for mounting adjacent to a visual task field comprising

light source means for emitting a spherical light pattern,

first means for directly converting said spherical light pattern to only a radial light pattern, and



second means for directly receiving and reflecting said radial light pattern into a controlled and substantially uniform light pattern onto said visual task field.

4,422,135

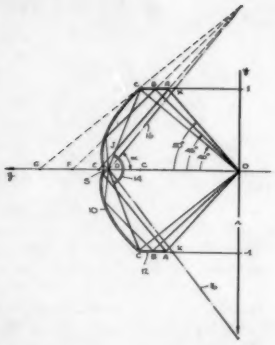
ANNULAR ILLUMINATOR

Calvin S. McCamy, Wappingers Falls, N.Y., assignor to Kollmorgen Technologies Corporation, Dallas, Tex.

Division of Ser. No. 83,618, Oct. 11, 1979, Pat. No. 4,320,442. This application Dec. 10, 1981, Ser. No. 329,411

Int. Cl.³ F21V *7/00*

U.S. Cl. 362—346 **2 Claims**



1. A 45° annular illuminator for reflecting flux comprising:

an elliptic reflector having a surface generated by rotating a segment of an ellipse about an optic axis, said segment intersecting said optic axis, the major axis of the ellipse forming an acute angle with said optic axis; and

a cylindric reflector having a surface generated by rotating a straight linear segment about said optic axis, said cylindric reflector being connected to said elliptic reflector at its extremities and adapted both to receive flux reflected from the concave surface of said elliptic reflector and to reflect said flux to a point on said optic axis at angles of incidence of between about 40° and about 50°.

4,422,136

SHOCK MOUNTING DEVICE FOR A LAMP

Charles J. Newman, and Joseph T. Hodges, both of Madison, Ind., assignors to The Grote Manufacturing Company, Inc., Madison, Ind.

Filed Mar. 25, 1982, Ser. No. 361,587

Int. Cl.³ F21V *15/04*

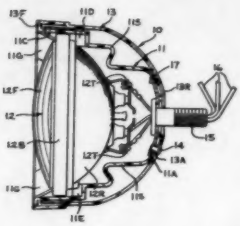
U.S. Cl. 362—390 **8 Claims**

1. A novel device for shock mounting a lamp within housing means for a lamp, comprising;

(a) a hollow generally frustoconical resilient member having a long central axis extending between centers of its opposite ends, with

(b) one of said opposite ends of said member including means for retaining, supporting and locating a lamp in a predetermined position, and

(c) the other of said opposite ends of said member including



means for fastening said member to said lamp housing means, and

(d) said member including plural segments positioned around said axis and extending between said opposite ends of said member, with

(e) each of said segments being generally serpentine in its longitudinal extension with respect to said axis.

4,422,137

MAGNETIC MOUNTING SUPPORT FOR LIGHT FIXTURE INCLUDING SHOCK ABSORPTIVE ARRANGEMENT

Thomas E. Watts, Shorewood, Wis., assignor to McGraw-Edison Company, Rolling Meadows, Ill.

Filed Jul. 26, 1982, Ser. No. 402,097

Int. Cl.³ F21V *15/04*

U.S. Cl. 362—390 **8 Claims**

1. A shock absorbtive mounting support for a light fixture, including in combination:

a base including magnet means for magnetically securing said mounting support on a magnetic support surface, said base defining an aperture therethrough;

support means adapted for mounting said light fixture thereon, including an end portion dimensioned for receipt in said aperture of said base, said support means including a support shaft having a threaded end portion and a stop defined adjacent said threaded end portion, said threaded end portion being inserted into said aperture of said base, the extend of insertion of said threaded end portion being limited by said stop;

resilient shock absorptive means received on said end portion of said support means in abutting relation with said

base, said resilient shock absorptive means comprising resilient washer means received on said threaded end portion of said support shaft;

fastener means received on said end portion of said support means in abutting relation with said resilient, shock absorptive means, said fastener means including a nut received on said threaded end portion, said nut being tightened down to secure said support shaft and said base in joined relation; and

concave washer means received on said threaded end portion of said support shaft between said nut and said resilient washer means.

4,422,138

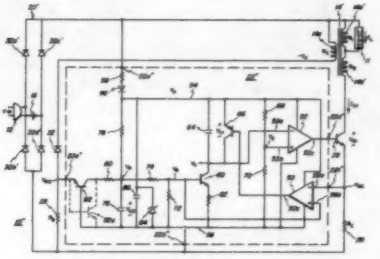
POWER SUPPLY FOR LOW-VOLTAGE LOAD

William P. Kornrumpf, Albany, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 11, 1981, Ser. No. 329,792

Int. Cl.³ H02M *3/335*

U.S. Cl. 363—21 **22 Claims**



1. A current-regulating power supply for energizing a load at a voltage magnitude less than the voltage magnitude provided by an A.C. source, comprising:

an autotransformer having a tapped winding, said load being connected solely between a first end and the tap of said winding;

switching means connected to said autotransformer only at a remaining end of said winding for enabling a flow of current from said source through said winding during the duration of a control signal;

means for providing a sampling signal of magnitude responsive to the instantaneous current flowing through said switching means; and

control circuit means for providing said control signal at an operating frequency at least an order of magnitude greater than the frequency of said A.C. source and for adjusting, responsive to said sampling signal magnitude, the proportion of time during each of a successive plurality of operating frequency cycles during which said switching means conducts current, to mainain the current through said load at a substantially constant value.

4,422,139

TRANSFORMER COUPLED UP-DOWN CONVERTER

Lowell E. Burkhead, Springville, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Mar. 29, 1982, Ser. No. 362,730

Int. Cl.³ H02P *13/22*

U.S. Cl. 363—21 **12 Claims**

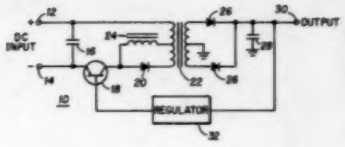
1. A power converting apparatus comprising:

input means for receiving DC power;

transformer means coupled to receive power from said input means and provide an output; and

conduction means coupled to said transformer means and said input means for conducting current from said input means and causing a charging current to flow from said input means through a first portion of said transformer means during a first time period to provide said output and for blocking current flow from said input means and causing a discharging current to flow through a second portion of said transformer means during a second time period to provide said output, said conduction means including:

switch means having a first conducting state and a second non-conducting state coupled to said input means for providing said charging current flow when said switch means is in said first conducting state and for blocking



said current flow when said switch means is in said second non-conducting state;

inductor means coupled to receive current flow from said switch means and provide said charging current through said first portion of the transformer means during said first time period; and

rectifier means coupled for conducting said discharge current flow from said inductor means through said second portion of said transformer means during said second time period.

4,422,140

MONITORING MEANS FOR INDUSTRIAL PROCESS PLANTS

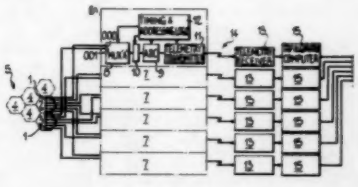
Albert B. Keats, Dorchester, England, assignor to United Kingdom Atomic Energy Authority, London, England

Filed Sep. 2, 1980, Ser. No. 183,451

Claims priority, application United Kingdom, Sep. 12, 1979, 7931561

Int. Cl.³ G06F *11/30, 15/46*

U.S. Cl. 364—184 **5 Claims**

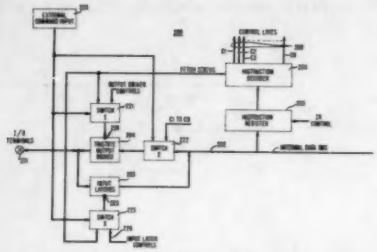


1. A monitoring means for an industrial process plant or apparatus which processes data signals from inputs from equipment or transducers associated with the processor apparatus and provides information or control signals therefor, the monitoring means including a data transmission assembly including a multiplexer arrangement, the data transmission assmebly being physically wired with inputs in the assembly disposed in a test pattern, the test pattern including a pluarlity of input addresses in the multiplexer arrangement for receiving test signals, which addresses rotate through the pattern, the rotation being effected by the physical wiring connected to the addresses.

4,422,141
MICROPROCESSOR ARCHITECTURE FOR IMPROVED CHIP TESTABILITY

Masakazu Shoji, Warren, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jul. 30, 1979, Ser. No. 61,741
Int. Cl.³ G06F *3/00, 11/00*
U.S. Cl. 364—200 **6 Claims**



1. A single-chip processor comprising:

a plurality of input/output terminals (e.g., **201**);

an internal data bus (e.g., **202**);

input latch means (e.g., **203**) operatively coupled to the input/output terminals (e.g., **201**) and to the internal bus (e.g., **202**), said input latch means (e.g., **203**) having an input latch control terminal (e.g., **225**), whereby said input latch means (e.g., **203**) delivers input data to the internal bus (e.g., **202**) from said input/output terminals (e.g., **201**) when said input latch control terminal (e.g., **225**) receives a positive signal;

tristate output driver means (e.g., **204**) operatively coupled to the input/output terminals (e.g., **201**) and having a plurality of input terminals and a control terminal (e.g., **224**);

instruction decoding means (e.g., **208**) for fetching at least a portion of an instruction during an instruction cycle and for controlling the execution of one or more processor operations specified by the instruction, the instruction decoder means (e.g., **208**) having a multiplicity of control lines, for providing control signals, including

an output driver control line for providing an output driver control signal, an input latch control line (e.g., **226**) for providing an input latch control signal, and a fetch status signal line for providing a fetch status signal when the instruction decoding means (e.g., **208**) is fetching said at least a portion of an instruction;

test input means (e.g., **220**) for delivering a command signal;

first switching means (e.g., **221**) responsive to the external command signal and operatively coupled to the fetch status signal line, to the output driver control line, and to the output control terminal (e.g., **224**) of the tristate output driver means (e.g., **204**), said first switching means being arranged for delivering the fetch status signal to said output control terminal (e.g., **224**) of the tristate driver means (e.g., **204**) in response to the presence of the command signal but otherwise for delivering the output driver control signal to the control terminal (e.g., **224**) of the tristate driver means (e.g., **204**);

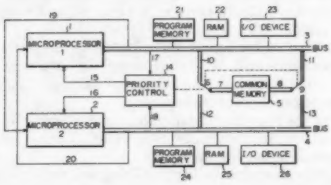
second switching means (e.g., **222**) operatively coupled to the control lines, the internal bus (e.g., **202**), and the input terminals of the output driver means (e.g., **204**), said second switching means (e.g., **222**) being responsive to the command signal and arranged for delivering the control signals from the instruction decoder (e.g., **208**) to the plurality of input terminals of the output driver means (e.g., **204**) when the command signal is present but otherwise for delivering bus data from the internal data bus (e.g., **202**) to the said plurality of input terminals of the output driver means (e.g., **204**), whereby said tristate driver (e.g., **204**) delivers the bus data from the second switching means (e.g., **222**) to the input/output terminals (e.g., **201**) when the command signal is absent provided that the output driver control signal is present, and whereby when the command signal is present said tristate driver means (e.g., **204**) delivers the control signals from the second switching means (e.g., **222**) to said input/output terminals provided that the fetch status signal is then absent but puts said tristate driver (e.g., **204**) into its high impedance state with respect to said input/output terminals (e.g., **201**) provided that the fetch status signal is then present; and

third switching means (e.g., **223**) operatively coupled to the fetch status signal line, to the input latch control line (e.g., **226**), and to the input latch control terminal (e.g., **225**) of the input latch means (e.g., **203**), said third switching means (e.g., **223**) being responsive to the command signal and arranged for delivering the fetch status signal to said input latch control terminal (e.g., **225**) when said command signal is present and otherwise for delivering the input latch control signal to the input latch control terminal (e.g., **225**), whereby the input latch control terminal (e.g., **225**) receives said positive signal from said switching means (e.g., **223**) when the command signal is absent provided that the input latch control signal is then present and also receives said positive signal when the command signal is present provided that the fetch status signal is then present.

4,422,142
SYSTEM FOR CONTROLLING A PLURALITY OF MICROPROCESSORS

Hajimu Inaba; Hideo Miyashita, both of Hino, and Shoichi Otsuka, Koganei, all of Japan, assignors to Fujitsu Fanuc Limited, Tokyo, Japan

Filed Jun. 17, 1980, Ser. No. 160,155
Claims priority, application Japan, Jun. 22, 1979, 54-78007
Int. Cl.³ G06F *13/00, 9/46*
U.S. Cl. 364—200 **1 Claim**



1. A system for controlling a plurality of microprocessors comprising:

a first and second microprocessor;

a first and second bus connected to said first and second microprocessors, respectively;

input and output devices connected to said first and second buses, respectively;

exclusive memories connected to said first and second buses, respectively;

at least one program memory connected to one of said first and second buses;

a common memory provided commonly for said first and second microprocessors;

address bus branches branched from said first and second buses for transmitting address signals to said common memory;

data bus branches branched from said first and second buses for transmitting data to said common memory;

switching means provided between said common memory and said bus branches, said switching means being adapted for selectively connecting said common memory through said bus branches to either said first or second bus; and

a priority control means for controlling priority of access of

said first and second microprocessors to said common memory, the input of said priority control means being connected to said first and second buses for receiving address selection signals, and the output thereof being connected to said first and second microprocessors for sending a wait signal thereto, said priority control means further providing a switch actuating output applied to said switches for switching said switches to determine the priority of access to said common memory between said first and second microprocessors on the basis of the received address selection signals;

at least two interruption circuits, one being connected between said first bus and an input terminal of said second microprocessor, and the other being connected between said second bus and an input terminal of said first microprocessor, said interruption circuits providing information from one of the microprocessors to the other of the microprocessors that the microprocessors are ready to access said common memory, thereby preventing simultaneous access to said common memory;

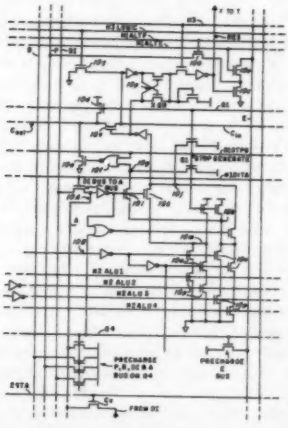
whereby the microprocessor which first accesses said common memory obtains the priority and the microprocessor which later accesses said common memory is maintained in the waiting state until the microprocessor obtaining the priority completes the operation.

4,422,143

MICROPROCESSOR ALU WITH ABSOLUTE VALUE FUNCTION

Karl M. Guttag, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 24, 1980, Ser. No. 209,917
Int. Cl.³ G06F 7/38
U.S. Cl. 364—200 **6 Claims**



1. An arithmetic logic unit for a microprocessor, such unit including a plurality of parallel stages, each stage comprising:

a first single-bit ALU input,

a second single-bit ALU input,

a single-bit carry-in input from a prior one of said stages,

a single-bit carry-out output to a next one of said stages,

a plurality of control lines for defining an operation performed in said arithmetic logic unit,

first logic means connected to receive said first and second inputs and responsive to said control lines for producing a carry propagate term output,

second logic means connected to receive said first and second inputs and responsive to said control lines for producing a carry generate term output,

third logic means providing an Exclusive NOR function and having first and second NOR inputs and an ALU output, the first NOR input being conditionally coupled to said carry generate term output through fourth logic means and also responsive to one of said control lines, the second NOR input being coupled to said carry propagate term output,

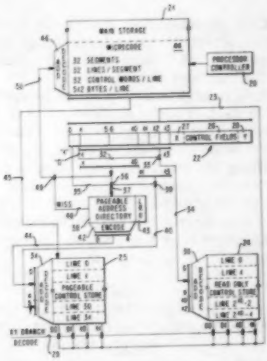
and said fourth logic means coupled to said first NOR input and to said carry generate term output being responsive to one other of said control lines.

4,422,144

MICROINSTRUCTION SUBSTITUTION MECHANISM IN A CONTROL STORE

Lance H. Johnson, Endicott; John A. Kiselak, II, Poughkeepsie; Edward A. Nadarzynski, Hopewell Junction, and Raymond J. Pedersen, Garrison, all of N.Y., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Jun. 1, 1981, Ser. No. 269,288
Int. Cl.³ G06F 9/26, 13/00
U.S. Cl. 364—200 **4 Claims**



1. Apparatus for providing a sequence of microinstructions on successive cycles for control of a data processing system in response to machine instructions including at least an operation code field comprising:

microinstruction storage means having a plurality of addressable microinstructions;

a control register connected to said microinstruction storage means for receiving, on successive cycles, a microinstruction for control of the data processing system;

addressing means connected to said microinstruction storage means for transferring a sequence of address manifestations to said microinstruction storage means for accessing microinstructions from said microinstruction storage means for transfer to said control register for execution; halt signalling means connected to said addressing means for generating a halt signal in response to predetermined ones of said sequence of address manifestations;

means connecting said halt signal to said control register for inhibiting control of the data processing system by microinstructions accessd by said predetermined ones of said sequence of address manifestations; and

address substitution means connected to said halt signalling means and said addressing means for transferring a substitute address manifestation to said addressing means in response to said halt signal for accessing said microinstruction storage means to read out a substitute microinstruction to said control register for execution.

4,422,145

THRASHING REDUCTION IN DEMAND ACCESSING OF A DATA BASE THROUGH AN LRU PAGING BUFFER POOL

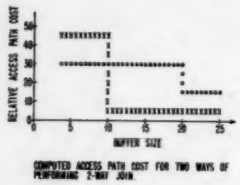
Giovanni M. Sacco, Turin, Italy, and Mario Schkolnick, Monte Sereno, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

PCT No. PCT/US81/01109, § 371 Date Oct. 26, 1981, § 102(e) Date Oct. 26, 1981, PCT Pub. No. WO83/00758, PCT Pub. Date Mar. 3, 1983

PCT Filed Aug. 18, 1981, Ser. No. 334,272

Int. Cl.³ G11C *9/06*

U.S. Cl. 364—300 **9 Claims**



COMPUTED ACCESS PATH COST FOR TWO WAYS OF PERFORMING 2-WAY JOIN

1. A CPU implementable method for minimizing thrashing among concurrent processes demand page accessing of a data base through an LRU page organized buffer pool, characterized in that the steps include:

allocating to each new process an independent LRU page frame stack of buffer elements;

ascertaining the set of pages over which there is looping access behavior by each process;

scheduling for execution only those processes for which there exists a frame stack large enough to hold the counterpart set of pages; and

upon the occurrence of a page fault, exercising an LRU page replacement discipline upon the counterpart stack.

4,422,146

RECONSTRUCTION METHOD OF A COMPUTED TOMOGRAPHIC IMAGE FROM A FEW X-RAY PROJECTIONS

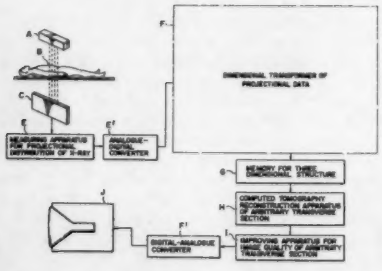
Shoichiro Yamaguchi, and Fujio Kobayashi, both of Tokyo, Japan, assignors to The President of Tokyo Institute of Technology, Tokyo, Japan

Filed Nov. 12, 1980, Ser. No. 205,909

Claims priority, application Japan, Nov. 22, 1979, 54-151461; Jan. 14, 1980, 55-002893; Jan. 14, 1980, 55-002894; Feb. 6, 1980, 55-013237

Int. Cl.³ G06F *15/42*

U.S. Cl. 364—414 **11 Claims**



1. A reconstructions method of a computed tomographic image from a few X-ray projections comprising:

(a) projecting X-rays from two desired directions toward tested tissue of a body for producing first and second X-ray projectional distributions of X-rays which have passed through the tested tissue;

(b) measuring the values d_k (k is natural number) of X-ray density on said first X-ray projectional distribution at a plurality of positions spaced apart from each other from one end of said first X-ray projectional distribution toward the other end thereof, and at the same time measuring the values $d_{k'}$ (k' is natural number) of X-ray density on said second X-ray projectional distribution at a plurality of positions spaced apart from each other from one end of said second X-ray projectional distribution toward the other end thereof, where said plurality of positions spaced apart from each other on the first and second X-ray projectional distributions for measurement of the values d_k and $d_{k'}$ of X-ray density are selected according to the following three criteria, (i) that the tomographic plane of the tested tissue of a body to be reconstructed is expressed by a pseudo-tomographic plane which is constituted collectively by mn pieces of picture elements, with m pieces of picture elements in a row and n in a column (both m and n are natural numbers), which are formed by dividing said tomographic plane of the tested tissue of a body into small sections and each of which has a single piece of X-ray density information, and that said pseudo-tomographic plane is placed between an X-ray source and said two X-ray projectional distributions, (ii) that said pseudo-tomographic plane is divided into a first part of a plane constructed collectively by said picture elements with i pieces in a row (i is natural number, $i < m$) and n picture elements in a column and a second part of a plane constituted collectively by said picture elements with (m-i) pieces in a row and n pieces in a column, (iii) that n rows, each of which is constituted by m pieces of picture elements are numbered in order 1,2, . . . , n from the left and that said m pieces of picture elements in each row are numbered respectively 1,2, . . . , m; m+1, m+2, . . . , 2m; . . . ; (n−1)m+1, (n−1)m+2, . . . mn from the side of said x-ray source toward the side of said two X-ray projectional distributions in order and that at least mn X-ray beams passing through said pseudo-tomographic plane from two directions comprise the first group of X-ray beams passing through respectively the left lower corner of each picture element in said first part of a plane and the second group of X-ray beams passing through respectively the left upper corner of each picture element in said second part of a plane, and said plurality of positions spaced apart from each other on said two X-ray projectional distributions for measurement of the values d_k and $d_{k'}$ of X-ray density correspond to the positions on said two X-ray projectional distributions which have X-ray density information to be obtained by passing said X-ray beams through said pseudo-tomographic plane;

(c) calculating the X-ray absorption coefficient μ_t (t=1,2, . . . , mn and t is a natural number) of each of mn pieces of picture elements based on the X-ray density values d_k and $d_{k'}$ measured in step (b) and length of the X-ray beams passing through each of the picture elements;

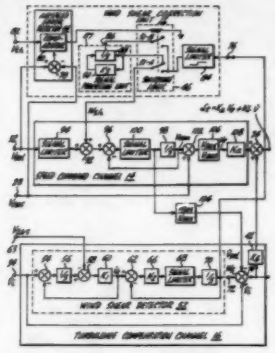
(d) reconstructing the computed tomographic image of said tested tissue of a body, where the picture elements having respective X-ray absorption coefficients $\mu_1, \mu_2, \ldots, \mu_{mn}$ calculated in step (c) are positioned at the locations of said picture elements numbered 1,2, . . . , mn of the pseudo-tomographic plane and wherein the complete collection of picture elements located in the m×n array constitute the reconstructed computed tomographic plane of the tested tissue of body.

4,422,147

WIND SHEAR RESPONSIVE TURBULENCE COMPENSATED AIRCRAFT THROTTLE CONTROL SYSTEM

Charles R. Hanke, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Sep. 8, 1980, Ser. No. 185,299
Int. Cl.³ G05D 1/08
U.S. Cl. 364—440 20 Claims



1. In an automatic control system of the type including a throttle controller that supplies a throttle control signal substantially reprsented by the expression $K_aV_e+K_bV$, where K_a and K_b are system gain factors, V_e is representative of the difference between the present airspeed of an aircraft utilizing said automatic control system and a selected airspeed, and V is representative of the longitudinal inertial acceleration of said aircraft, the improvement comprising:

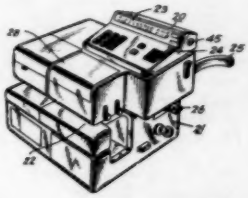
wind shear correction means for supplying a compensation signal to supplement said throttle control signal during periods of time in which the difference between said present airspeed and said selected airspeed of said aircraft is at least partially due to atmospheric wind shear, said compensation signal being of the form $W_sF(s)$, where W_s is representative of the wind shear encountered by said aircraft and F(s) denotes a frequencey dependent transfer function, said wind shear correction means including signal processing means responsive to a signal representative of said present airspeed of said aircraft and responsive to a signal representative of said longitudinal inertial acceleration of said aircraft for supplying said compensation signal to said throttle controller, said signal processing means including wind shear detection means, said wind shear detection means including means for deriving a signal which theoretically represents the acceleration of said aircraft from said signal representative of said present airspeed, means for determining the difference between said signal theoretically representative of said acceleration and said signal representative of said longitudinal inertial acceleration of said aircraft, means for filtering said difference signal to remove at least a portion of those signal components representative of atmospheric turbulence other than wind shear and means for coupling said filtered difference signal to said throttle controller as said compensation signal, said means for coupling said filtered difference signal to said throttle controller including means for determining that the difference between said present airspeed and said selected airspeed exceeds a predetermined value and means for supplying said filtered difference signal to said throttle controller only when said difference between said present airspeed and said selected airspeed exceeds said predetermined value, said means for coupling said filtered difference signal to said throttle controller further including means for combining said filtered difference signal with said throttle control signal to provide a signal of the form $K_aV_e+K_bV$ when said difference between said present airspeed and said selected airspeed is less than said predetermined value and to provide a signal of the form $K_aV_e+K_bV+W_sF(s)$ when said difference between said present airspeed and said selected airspeed exceeds said predetermined value.

4,422,148

ELECTRONIC POSTAGE METER HAVING PLURAL COMPUTING SYSTEMS

John H. Soderberg, Monroe, N.Y.; Alton B. Eckert, Norwalk, and Robert B. McFiggans, Stamford, both of Conn., assignors to Pitney Bowes Inc.

Division of Ser. No. 89,413, Oct. 30, 1979, Pat. No. 4,301,507.
This application May 6, 1981, Ser. No. 261,001
The portion of the term of this patent subsequent to Nov. 17, 1998, has been disclaimed.
Int. Cl.³ G06F 15/20
U.S. Cl. 364—464 19 Claims



1. In a postal meter having a keyboard and display, central accounting and imprinting mechanism, and including accounting means, a control means, and a printer means, said accounting means controlling all of the accounting functions of the meter, said control means controlling all of the keyboard and display functions of the meter, and said printer means controlling the setting of the print mechanism and monitoring the mechanical functions thereof, the improvement wherein said postal meter comprises an interconnect means adapted to connect said control means to an external device, means for periodically scanning said interconnect means for signals, means responsive to a determined input on said interconnect means from an external device for transferring the function of said control means to signals at said interconnect means whereby said interconnect means represents said external device in communication with said accounting means and said printer means for providing data to said postal meter.

4,422,149

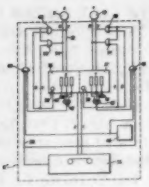
PROCESS AND APPARATUS FOR THE CORRECTION OF THE CONTROL PROGRAM OF AN AUTOMATIC GLASS SHEET CUTTING MACHINE

Heinz-Josef Reinmold; Horst Mücha, and Wilhelm Arnoldi, all of Aachen, Fed. Rep. of Germany, assignors to Saint Gobain Vitrage, Neuilly-sur-Seine, France

Filed Jan. 14, 1981, Ser. No. 224,948
Claims priority, application Fed. Rep. of Germany, Jan. 21, 1980, 3001954
Int. Cl.³ G06F 15/46; G05B 19/18
U.S. Cl. 364—473 6 Claims

1. Method for correcting the control program of an automatic glass cutting machine where said machine has a scanning head equipped with an X-pulse emitter and a Y-pulse emitter adapted to be guided along a closed path defined in Cartesian X and Y coordinates representing a line along which glass sheet is to be cut and has a memory for storing the signals emitted by the emitters, comprising the step of adding the signals emitted by the emitters in an X counter and in a Y

counter in the form of positive or negative pulses according to whether the scanning head moves in the positive or negative direction of the X and Y axes when moving along the closed path, the step of comparing the total number of pulses in each counter at the initial starting point of the movement of the recording head about the closed path with the total number of



signals in each counter at the termination point of the movement of the head about the closed path, and the step of adding to the program the required number of pulses to make the number of pulses in each counter at the end of the movement of the head about the closed path equal to the number in each counter at the initial start of movement of the head about the closed path.

4,422,150

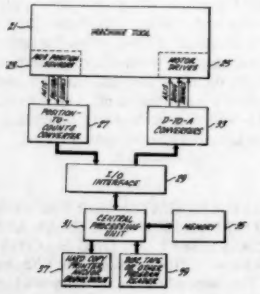
MACHINE TOOL CONTROLLER AND PART INSPECTION MONITOR

Bruce E. Keller, Federal Way; Robert B. Andrews, Jr.; Charles F. Wylie, both of Puyallup, and Kenneth W. Brinkerhoff, Bellevue, all of Wash., assignors to The Boeing Company, Seattle, Wash.

Continuation of Ser. No. 152,665, May 23, 1980, abandoned. This application Jun. 24, 1982, Ser. No. 391,608

Int. Cl.³ G06F *15/46*

U.S. Cl. 364—475 **13 Claims**



11. In a machine tool controller for controlling a machine tool such that the relative position of a part to be machined and a cutter for machining said part follow a predetermined path, the improvement comprising:

position sensors for continuously determining the relative position of the part to be machined and the cutter along predetermined axes and continuously producing axes position signals related thereto; and,

data processing means connected to said position sensors for: (a) receiving said continuously produced axes position signals; (b) continuously determining the transfer function of said machine tool based on the information contained in said continuously produced axes position signals; and, (c) utilizing said transfer function information to control the production of position command signals adapted to control said machine tool such that said cutter follows said predetermined path of travel.

4,422,151

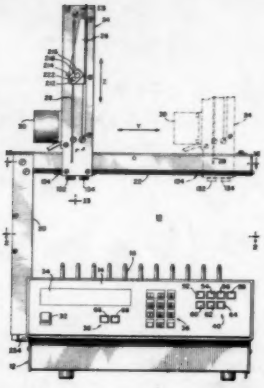
LIQUID HANDLING APPARATUS

Robert E. Gilson, 4 N. Franklin Ave., Madison, Wis. 53705

Filed Jun. 1, 1981, Ser. No. 268,659

Int. Cl.³ G06F *15/46, 15/20;* G06G *7/58, 7/48*

U.S. Cl. 364—496 **33 Claims**



1. Liquid handling apparatus comprising a table member; rack means supported on said table member for supporting a plurality of receptacles arrayed in predetermined positions above said table member; a subframe having a first portion mounted beneath said table member for rectilinear movement in a horizontal X direction; an X-drive motor supported in a fixed position relative to said table member; X-drive means interconnecting said X-drive motor and said subframe; said subframe including an upstanding portion extending above said table member and a horizontal portion overlying the table member; a Y-drive motor mounted on the first subframe portion; a carriage mounted on said subframe horizontal portion for rectilinear movement in a transverse, horizontal Y direction; Y-drive means interconnecting said Y-drive motor and said carriage; a gantry detachably supported on said carriage; a holder device mounted on said gantry for rectilinear movement in a vertical Z direction; a Z-drive motor mounted on said gantry; Z-drive means coupled between said holder drive and said Z-drive motor, said gantry, holder device, Z-drive motor and Z-drive means being detachable from said carriage as a unit; and control means for selectively energizing said drive motors for moving said carriage into positions corresponding to said receptacle positions and for moving said holder device vertically with respect to said receptacles said X-, Y- and Z-drive motors cooperating with said X-, Y- and Z-drive means and with said control means for selectively moving said holder device in three mutually perpendicular directions.

4,422,152

AUTOMATIC FIXED-QUANTITY/VARIABLE-TIME ANTI-OXIDATION REPLENISHER CONTROL SYSTEM

Kenneth M. Kaufmann, Minneapolis, Minn., assignor to Pako Corporation, Minneapolis, Minn.

Filed Nov. 19, 1981, Ser. No. 323,073

Int. Cl.³ G06F *15/46;* G03D *3/06*

U.S. Cl. 364—502 **7 Claims**

7. A computer-based control system for controlling anti-oxidation replenisher means for providing anti-oxidation replen-

ishment to a processor of photosensitive material, the control system comprising:

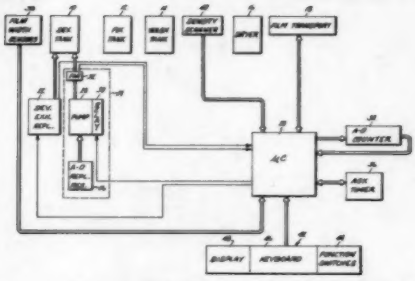
clock means for measuring a time interval and providing a signal indicative of expired time of the interval;

exhaustion replenishment means responsive to a first replenishment signal for providing exhaustion replenishment;

means for providing a signal indicative of use of processor fluid;

anti-oxidation replenishment means responsive to a second replenishment signal for providing a predetermined amount of anti-oxidation replenishment; and

programmed digital computer means for: storing a digital value representing an exhaustion replenishment rate; receiving the signal indicative of use of processor fluid; storing a digital value representing an anti-oxidation replenishment rate; providing the first replenishment signal to the exhaustion replenishment means as a function of the use of processor fluid and the digital value representing



the exhaustion replenishment rate; providing a first digital replenishment value indicative of an accumulated amount of anti-oxidation replenishment provided by exhaustion replenishment during the time interval; providing a second digital replenishment value indicative of the anti-oxidation replenishment needed as a function of the stored digital value representing the anti-oxidation replenishment rate and the signal indicative of expired time of the interval; comparing the first digital replenishment value with the second digital replenishment value periodically; providing the second replenishment signal to the anti-oxidation replenishment means when the difference by which the second digital replenishment value exceeds the first replenishment value is equal to or greater than a preset digital value; and

resetting the clock means to reinitiate the time interval when anti-oxidation has been provided by the anti-oxidation replenishment means in response to the second replenishment signal.

4,422,153

OBLIQUE PROJECTION ORIGINAL AND OBLIQUE PROJECTION ORIGINAL FORMING APPARATUS AND METHOD

Yoshio Arai; Hiroyuki Kataoka, and Nobuaki Endo, all of Ebina, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

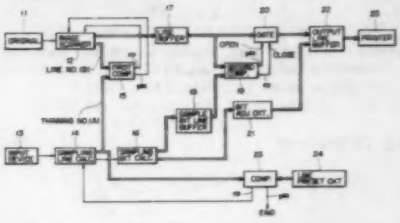
Filed Sep. 15, 1980, Ser. No. 187,033

Claims priority, application Japan, Sep. 14, 1979, 54-117362

Int. Cl.³ G03B *21/00*; G06F *15/20*

U.S. Cl. 364—525 **3 Claims**

1. An oblique projection original formed by deforming an orthogonal projection original in such a manner that a rectangular original is transformed into a trapezoidal original by compressing said orthogonal projection original by thinning scanning lines in a horizontal direction by calculating line numbers for said orthogonal projection original which are selected as data lines for said oblique projection original, thinning predetermined bits in each scanning line in a vertical direction, compressing each line by reducing first and last portions of each scanning line by half of the number of said bits



thus thinned after said predetermined bits are thinned, and inserting white bits at said first and last portions of each scanning line to complete each scanning line.

4,422,154

TEMPERATURE COMPENSATION OF TUNABLE ACOUSTIC OPTICAL FILTERS

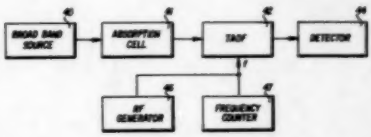
Leonard M. Smithline, and George J. Wolga, both of Ithaca, N.Y., assignors to Lansing Research Corporation, Ithaca, N.Y.

Continuation-in-part of Ser. No. 40,644, May 21, 1979, Pat. No. 4,272,825. This application Feb. 27, 1981, Ser. No. 238,916

The portion of the term of this patent subsequent to Jun. 9, 1998, has been disclaimed.

Int. Cl.³ G02F *1/135, 1/29*; G05B *15/02*

U.S. Cl. 364—571 **2 Claims**



2. Apparatus for compensating the tuning curve of a TAOF for variations in the temperature of the TAOF, said tuning curve being a temperature dependent relationship of the center wavenumber of the TAOF to the frequency of an acoustic beam, said apparatus comprising:

(a) a broad band light source;

(b) an absorption cell betwen said broad band source and said TAOF for absorbing radiation from said broad band source at preselected optical frequencies so as to provide light at a reference wavenumber to the optical input of the TAOF;

(c) photodetector means for providing a signal representing the intensity of said light at an optical output of the TAOF;

(d) means for providing a variable frequency acoustic beam to the TAOF;

(e) means for varying the frequency of the acoustic beam to the TAOF in response to the signal representing the intensity of light from the TAOF until the signal is minimized by causing the center wavenumber of the TAOF to coincide with a reference wavenumber, and for holding the frequency of the acoustic beam constant at the point of coincidence; and

(f) means for ratioing the frequency of the acoustic beam to the frequency of an acoustic beam corresponding to the reference wavenumber at a reference TAOF temperature, whereas the ratio of acoustic frequencies is a function of the temperature of the TAOF; and

(g) means for storing values representing a tuning curve relationship of the center wavelength of the TAOF and the frequency of an acoustic beam at a reference condition

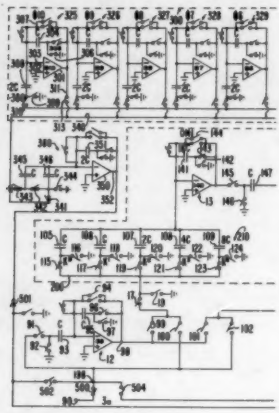
and for modifying said values by the acoustic frequency ratio to correct for the temperature of the TAOF.

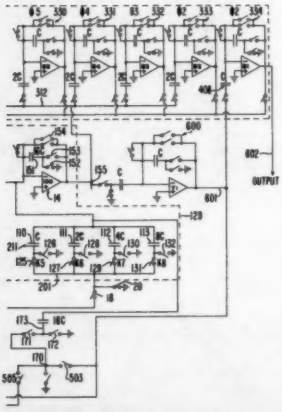
4,422,155

MULTIPLIER/ADDER CIRCUIT

Gideon Amir, San Jose; Roubik Gregorian, Sunnyvale, and Ghanshyam Dujari, San Jose, all of Calif., assignors to American Microsystems, Inc., Santa Clara, Calif.

Filed Apr. 1, 1981, Ser. No. 249,775
Int. Cl.³ G06J *1/00*
U.S. Cl. 364—606 **10 Claims**





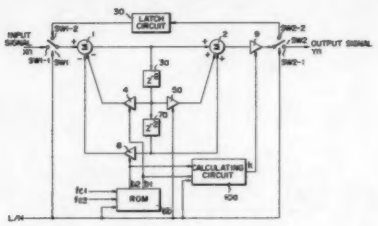
1. An analog multiplier circuit comprising:
an input terminal for the reception of an analog signal;
means for receiving a plurality of binary input signals;
a first plurality of sample and hold circuits connected in series for multiplying said analog signal by the number represented by said plurality of binary input signals;
a second plurality of gain controlling means, each uniquely associated with one of said plurality of sample and hold circuits for controlling the gain thereof;
switch means associated with each of said gain controlling means, each of said switch means controllable by a corresponding one of said binary input signals which is uniquely associated with said switch means;
whereby said binary input signals control the connection of said gain controlling means and thus the gain of said analog multiplier circuit and the value of said output signal derived from said analog signal.

4,422,156

DIGITAL FILTER DEVICE

Shigenori Sano, Higashi-Yamato, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Apr. 21, 1981, Ser. No. 256,187
Claims priority, application Japan, Apr. 22, 1980, 55-53179; Apr. 22, 1980, 55-53181; Apr. 22, 1980, 55-53182
Int. Cl.³ G06F *15/34*
U.S. Cl. 364—724 **10 Claims**



1. A digital filter device comprising:
a digital filter means for filtering a digital input signal in accordance with a predetermined transfer function H(z), said transfer function H(z) being

$$H(z) = \frac{K(1 \pm z^{-1})^2}{1 + b1z^{-1} + b2z^{-2}}$$

said digital filter means including means for carrying out a calculating operation;
a memory means coupled to said digital filter means for storing coefficients b1 and b2 and for selectively delivering said coefficients b1 and b2 to said digital filter means for using in a calculating operation in said digital filter means; and
a coefficient calculating means coupled to said memory means for calculating a coefficient K using coefficients b1 and b2 read out from said memory means, said coefficient calculating means performing an operation

$$K=(1\pm b1+b2)/4$$

to calculate the coefficient K, and said coefficient K being used for the calculating operation in said digital filter means;
said coefficient calculating means including:
first and second registers to which are respectively supplied the coefficients b1 and b2 from said memory means;
a generating means for generating a data of numeral "1" (+V); and
an arithmetic means for receiving outputs from said first and second registers and data of numeral "1" generated from said generating means for performing the addition (1±b1+b2) and for shifting a decimal point of the addition result by 2 bits toward an upper digit for to obtain said coefficient K.

4,422,157

BINARY MOS SWITCHED-CARRY PARALLEL ADDER

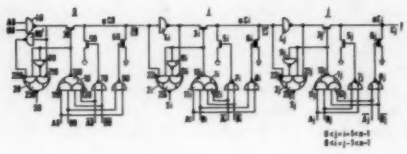
Arnold Uhlenhoff, Emmendingen, Fed. Rep. of Germany, assignor to ITT Industries Inc., New York, N.Y.

Filed Aug. 26, 1981, Ser. No. 296,398

Claims priority, application Fed. Rep. of Germany, Sep. 20, 1980, 3035631

Int. Cl.³ G06F 7/50

U.S. Cl. 364—786 6 Claims



1. A monolithic integrated n-stage parallel adder for two numbers each represented in an n-digit binary code, where n is an integer greater than one, each stage of said adder employing enhancement-mode insulated-gate field-effect transistors of the same conductivity type and having a carry signal switched therethrough by an electronic changeover switch, each of said n+stages comprising:

a first EXCLUSIVE-OR block including a first AND gate having two inputs each receiving a different one of an associated digit of said two numbers, a second AND gate having two inputs each receiving a different one of an inverse of said associated digit of said two numbers and a first NOR gate having two inputs each coupled to an output of a different one of said first and second AND gates;

a second EXCLUSIVE-OR block including third and fourth AND gates each having a first input coupled to the output of said first NOR gate and a second input coupled to a carry signal output of the next lower-order stage of said n+stages and a second NOR gate having two inputs each coupled to an output of a different one of said third and fourth AND gates to provide a sum signal for its associated one of said n+stages;

an ON/OFF transistor switch or said changeover switch having its controlled current path coupled between the output of an inverter coupled to said carry signal output of the next lower-order stage of said n+stages and a carry signal output of said associated one of said n+stages and a gate coupled to the output of said first NOR gate, said inverter in the lowest-order stage of said n+stages being replaced by a NAND block to combine said associated digits of said two numbers;

a first switching transistor having its controlled current path coupled between said carry signal output of said associated one of said n+stages and a first terminal of a power supply;

a second, depletion mode switching transistor having its controlled current path coupled between said carry signal output of said associated one of said n+stages and a second terminal of said power supply;

a first NOR block having two inputs each receiving a different one of said associated digits of said two numbers and an output coupled to a gate of one of said first and second switching transistors; and

a second NOR block having two inputs each receiving a different one of said inverse of said associated digit of said two numbers and an output coupled to a gate of the other of said first and second switching transistors.

4,422,158

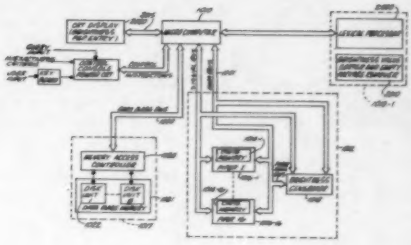
METHOD AND MEANS FOR INTERROGATING A LAYERED DATA BASE

Louis M. Galie, Culver City, Calif., assignor to System Development Corporation, Santa Monica, Calif.

Filed Nov. 28, 1980, Ser. No. 210,961

Int. Cl.³ G06F 7/20, 15/40

U.S. Cl. 364—900 12 Claims



11. A method using a digital data processing system for locating in a stored data base, entries which have a variable degree of match, including either exact or inexact matches, with the entries of a query and for determining the degree of such match,

the data base comprising a plurality of layers ordered in a hierarchical order, each layer comprising a plurality of entries,

each of the entries of the query and of the data base having representations of one or more event types and of the order of occurrence of the event types in such entry, each of a plurality of the entries on one layer having a corresponding event type represented on a higher level layer in the hierarchical order,

the method comprising the steps of operatively controlling the digital data processing system for:

(a) processing representations of the event types and the order of occurrence thereof represented by each of the entries of the query with representations of the event types and the order of occurrence thereof in each of a plurality of the entries on a first data base layer in the hierarchy to thereby determine and form a corresponding package for each of a plurality of entries of the query, the packages having an assigned order,

each package comprising representations of one or more data base entries on the first data base layer and, corresponding to each such data base entry, a representation of a degree of match, the representation of a degree of match varying as a function of the degree of match of presence and order of occurrence of event types in a data base entry with like event types in a query entry; and

(b) processing representations of at least selected ones of the data base entries (also second level event types) represented in the packages and the assigned order of the packages in which such selected ones of the data base entries occur with representations of the event types and the order of occurrence thereof in each of a plurality of the entries on a second one of the data base layers which is at a higher level in the hierarchy than the level of the first data base layer to thereby determine and form representations of one or more of the data base entries on said second one of the data base layers and, to thereby determine and form for each of individual ones of such one or more of the data base entries on said second one of the data base layers, a representation of an additional degree of match as to presence and order of occurrence of event types resulting from the processing in this step (b),

the last recited step of processing including the step of pro-

cessing the representations of the degree of match associated with each of individual ones of the event types in a plurality of the packages in forming the representations of the additional degree of match as a function of the representations of the degree of match in the packages,

each such representation of the additional degree of match thereby representing the degree of match as to the presence of and the order of the event types and the entries in the query as compared with the presence and the order of the event types in both said first and second data base layers.

4,422,159

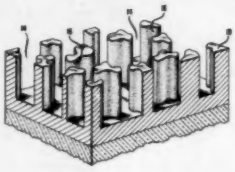
OPTICAL INFORMATION STORAGE AND RETRIEVAL

Harold G. Craighead, Fair Haven, and Richard E. Howard, Holmdel, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sep. 3, 1981, Ser. No. 299,172

Int. Cl.³ G11C *13/04*

U.S. Cl. 365—127 **23 Claims**



1. A process for storing information in a storage medium comprising the steps of treating said storage medium with a source of energy so that optical changes which define said information are produced in said storage medium characterized in that said storage medium comprises a material having a region that has a configuration including void volumes that delimit storage structures wherein the total area of all said storage structures in said region is between 10 and 90 percent of the area of a plane at the medium surface coextensive with said region wherein the characteristic distance of said configuration is equal to or smaller than the wavelength of the electromagnetic radiation ultimately used to read said information, and wherein an optical change is induced with said source of energy by altering the optical properties of said storage structures that are impacted by said energy in a region where information is to be stored.

4,422,160

MEMORY DEVICE

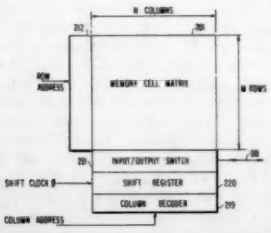
Hiroshi Watanabe, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Jan. 4, 1982, Ser. No. 336,986

Claims priority, application Japan, Jan. 8, 1981, 56-1684

Int. Cl.³ G11C *13/00*

U.S. Cl. 365—189 **7 Claims**



1. A memory device comprising a memory cell matrix including a plurality of memory cells arrayed in rows and columns, a set of address terminals, means for receiving a row strobe signal, means for receiving a column address strobe signal, row address means for operatively incorporating row address signals through said address terminals in response to active state of said row strobe signal, row selection means for operatively enabling selected one of said rows based on the incorporated row address signals in response to the active state of said row strobe signal, first column control means for operatively generating a first signal in response only to such an active state of said column address strobe signal that occurs at the first time after said row address strobe signal becomes active, second column control means for operatively generating a second signal in response to the respective active states of said column strobe signal under the active state of said row address strobe signal, column address means for operatively incorporating column address signals through said address terminals in response to said first signal, shift register means having a plurality of states whose outputs are adapted to select at least part of said columns of said memory cell matrix, and means for controlling shift operation of said shift register in response to said second signal.

4,422,161

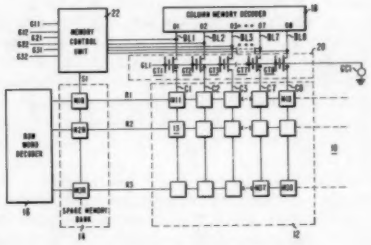
MEMORY ARRAY WITH REDUNDANT ELEMENTS

Henry Kressel, Elizabeth, and Sheng T. Hsu, Lawrenceville, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Oct. 8, 1981, Ser. No. 309,694

Int. Cl.³ G11C *7/00*

U.S. Cl. 365—200 **8 Claims**



2. A monolithic integrated circuit comprising:

a standard memory array of cells arranged in rows and columns, with a row conductor per row of cells and a column conductor per column of cells;

a row decoder and a column decoder;

means coupling the row decoder to the row conductors;

a plurality of programmable non-volatile electrically alterable elements, each one of said elements having a main conduction path and a control electrode;

a first set of said non-volatile electrically alterable elements having their main conduction paths connected between the column decoder and the column conductors;

a spare column of cells having the same number of rows as said standard array; and

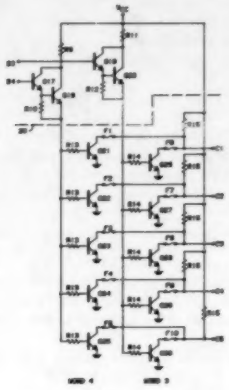
a second set of said non-volatile electrically alterable elements having their main conduction paths connected between said column decoder and said spare column.

4,422,162

NON-DISSIPATIVE MEMORY SYSTEM

Walter L. Davis, Plantation, and Douglas R. Kraul, Sunrise, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 1, 1980, Ser. No. 192,678
Int. Cl.³ G11C 11/40
U.S. Cl. 365—227 15 Claims



1. A memory system for a low powered device and comprising:

multiple input terminals for selectively supplying memory addressing signals;

decoder means coupled to and deriving all power from said memory addressing signals, providing ones of a predetermined number of separate word accessing signals in response to predetermined combinations of said input memory addressing signals;

a plurality of output terminals; and

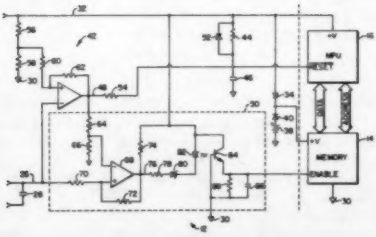
an array of memory cells coupled to the decoder means and each cell providing predetermined signals at each of the output terminals in response to a respective one of the word accessing signals.

4,422,163

POWER DOWN CIRCUIT FOR DATA PROTECTION IN A MICROPROCESSOR-BASED SYSTEM

Ralph J. Oldenkamp, Foster City, Calif., assignor to Vend-A-Copy, Inc., Dallas, Tex.

Filed Sep. 3, 1981, Ser. No. 299,255
Int. Cl.³ G11C 7/00
U.S. Cl. 365—229 4 Claims



1. In a microprocessor-based system having a digital memory device which is subject to erasure of contents upon loss of electrical power thereto and having a microprocessor unit, said digital memory device having an enable control for enabling and disabling operation of said digital memory device, and said microprocessor unit having a reset control for reinitializing operation of said microprocessor unit, an apparatus for preventing loss of digital information stored in said digital memory device during periods of inadequate power from a main power supply, said apparatus comprising:

DC battery means switchably coupled to a power supply terminal of said digital memory device;

means coupled to sense power level applied to said digital memory device at said power supply terminal and to sense power level applied to said microprocessor unit at a power supply terminal of said microprocessor unit for detecting a drop in power to said digital memory device and to said microprocessor unit, wherein said detecting means comprises a first comparator having as one input a reference voltage having a decay time constant greater than the decay time constant of said main power supply, said first comparator having as its other input voltage sense at the power supply terminal of said microprocessor unit, wherein the output of said first comparator is coupled to drive said switching means and with said microprocessor unit disabling means;

means responsive to said detecting means for disabling said digital memory device immediately upon a detected drop in power to said digital memory device thereby to prevent erasure of information in said digital memory device, wherein said microprocessor unit disabling means comprises a resistor coupled between the output of said first comparator and a RESET terminal of said microprocessor unit and a capacitor coupled between said RESET terminal and ground to form an R-C network;

means responsive to a sensed drop in power to said power terminal of said digital memory device and operative to switch said battery means to said power terminal of said digital memory device for preventing loss of information in said digital memory device, wherein said power loss preventing means comprises a first diode and a second diode, said first diode being disposed to conduct current between said battery and said power supply terminal of said digital memory device and said second diode being coupled to conduct power from said main power supply to said power supply terminal of said digital memory device, wherein said switching means comprises a second comparator having as one input said reference voltage and as its other input the output of of said first comparator, and an isolation network coupled to receive an output of said second comparator, said isolation network having an output which is controllably switchable between a normally high voltage level and ground potential, said isolation network output being coupled to a control input of said digital memory device to enable operation, wherein said isolation network is coupled to said high voltage level at the power supply terminal of said microprocessor unit, and wherein said R-C network further includes a diode across said resistor which is normally forward biased only when voltage at said microprocessor unit power supply terminal is less than the voltage across said capacitor for assuring discharge of said capacitor; and

means for disabling said microprocessor unit.

4,422,164

ON-BOTTOM SEISMOMETER ELECTRONIC SYSTEM

Edgar A. Bowden, Arlington; Gordon R. Deline, Carrollton, and Gerard D. Koeijmans, Dallas, all of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jun. 27, 1980, Ser. No. 163,757
Int. Cl.³ G01V 1/24, 1/38
U.S. Cl. 367—15 14 Claims

1. An ocean bottom seismometer unit for recording waves traveling from a source of seismic pulses comprising:

a hydrophone producing signals representing water break waves arriving at said hydrophone through the water from said source;

a water break detector responsive to said hydrophone sig-

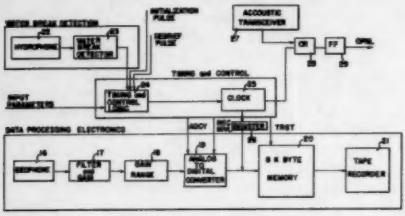
nals producing a water break signal representing the arrival of said water break waves at said hydrophone;

means for digitizing the time of occurrence of said water break waves at said hydrophone;

means for digitizing the time of occurrence of said water break signal;

a digital memory;

means for storing a plurality of said digitized water break signal times in said digital memory before recording them on said magnetic tape recorder unit whereby an array of



digitized water break signal times are stored in said memory after each seismic pulse;

a magnetic tape recorder unit and;

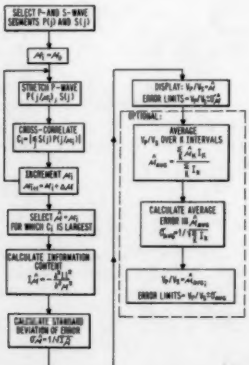
timing and control means for starting said magnetic tape recorder unit and ransferring said digitized water break signal times from said digital memory to said recorder unit for recording after the occurrence of a seismic pulse and stopping said magnetic tape recorder unit after the recording of said digitized water break signal times and before the occurrence of the next seismic pulse.

4,422,165

MAXIMUM LIKELIHOOD ESTIMATION OF THE RATIO OF THE VELOCITIES OF COMPRESSIONAL AND SHEAR WAVES

Stephen W. Thomas, DeSoto, Tex., and Robert M. Otis, Littleton, Colo., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Feb. 11, 1981, Ser. No. 233,541
Int. Cl.³ G01V *1/36*
U.S. Cl. 367—40 **10 Claims**



1. A method of seismic exploration by determining the ratio of the velocities of compressional and shear waves in subterranean formations comprising the steps of:

recording the output of one or more detectors of seismic energy with respect to both compressional and shear waves emitted from a single source and reflected from similar points defining an interval of interest in the earth's subterranean scructure as a function of time;

stretching the record of the compressional wave with respect to time by a predetermined stretch ratio;

measuring the correlation of wave shape between the stretched record of the compressional wave and the record of the shear wave;

recording the accuracy of the correlation;

modifying the stretch ratio;

re-performing said steps of stretching, correlating and recording;

repeating said steps of changing the stretch ratio, stretching, correlating and recording; and

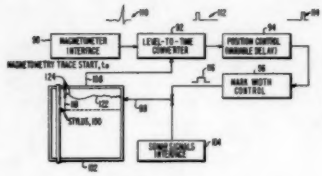
selecting that stretch ratio which maximizes the correlation between the stretched compressional wave and the unstretched shear wave as the ratio of the velocities of compressional waves and shear waves in said interval of interest.

4,422,166

UNDERSEA SONAR SCANNER CORRELATED WITH AUXILIARY SENSOR TRACE

Martin Klein, Salem, N.H., assignor to Klein Associates, Inc., Salem, N.H.

Filed Aug. 17, 1981, Ser. No. 293,656
Int. Cl.³ G01S *15/89*
U.S. Cl. 367—115 **15 Claims**



1. A method for identification of undersea metallic objects comprising the steps of:

providing an intensity modulated pictorial sonar echo record of sea bottom features with a scanning marker in response to a sonar signal from a sonar transducer;

positionally associating a metal detector with said transducer;

receiving an output signal from said metal detector associated with said transducer;

converting the magnitude of the metal detector output signal to a pulse occurring at a time referenced to the start of scan of said marker; and

activating said scanning marker with said pulse to provide a segregated record of the metal detector output adjacent to and positionally independent from the sonar echo intensity record on a single scanning marker.

4,422,167

WIDE-AREA ACOUSTO-OPTIC HYDROPHONE

Peter Shajenko, Storrs, Conn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

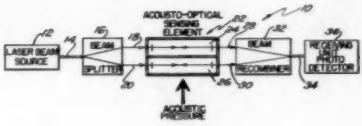
Filed Jun. 25, 1981, Ser. No. 277,297
Int. Cl.³ H04R *23/00*
U.S. Cl. 367—149 **4 Claims**

1. An acousto-optic hydrophone system for sensing impinging acoustic pressure waves, said hydrophone system comprising:

laser beam generating means for providing a source laser beam;

beam splitting means for receiving said source beam and producing a signal beam and a reference beam therefrom;

hydrophone means, having an optically transparent bulk material sensing medium filling all voids over a wide area therein, for receiving said signal beam and said reference beam from said beam splitting means and directly distributing said signal beam and said reference beam in separate, fixed equal path length wide area patterns throughout said bulk material in such a way as to modulate said signal beam in proportion to dynamic pressure variations of said impinging acoustic waves while said reference beam is not so modulated, said modulation resulting solely from changes in the index of refraction of said bulk material proportional to said dynamic pressure variations, said hydrophone means further comprising a dual chambered box, the interior of which is separable into a first chamber and a second chamber, said first chamber having one side thereof open, a rigid dividing wall mounted within said dual chambered box essentially parallel to said open side for separating the internal volume of said box into said first chamber and said second chamber, a plurality of optical reflector pairs, one each reflector of said reflector pair being rigidly mounted to opposite sides of said dividing wall at each preselected location, said plurality of pairs being arranged in such equal path length patterns as to fold said signal beam and said reference beam over a relatively wide area of each of said first and second chambers using multi-reflection off said optical reflectors, a microhole through said dividing wall, said microhole



connecting said first chamber and said second chamber together, a plurality of optically transparent input windows mounted in an external wall common to said first chamber and said second chamber through which said signal beam and said reference beam may pass, a plurality of optically transparent output windows mounted in said common external wall out through which said modulated signal beam and said unmodulated reference beam may pass, optically transparent bulk material of suitable compressibility through which said signal beam and said reference beam is made to directly pass, said bulk material filling remaining voids in said first chamber, said second chamber and said microhole, a flexible membrane, covering and fixedly attached to said open side of said first chamber, for transmitting said impinging acoustic pressure waves into said bulk material within said first chamber thereby varying the index of refraction thereof while said microhole filters said impinging acoustic pressure waves out of said second chamber;

beam recombining means for receiving said modulated signal beam and said unmodulated reference beam from said hydrophone means and focusing said modulated signal beam and said unmodulated reference beam in such a way as to form a single recombined modulated beam; and

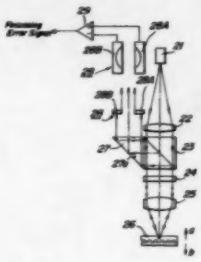
laser beam receiving means for receiving and converting said single recombined modulated beam into an electrical signal proportional to said impinging acoustic pressure waves.

4,422,168

METHOD AND APPARATUS FOR DETECTING A FOCUSSING CONDITION OF AN OBJECTIVE LENS

Kenichi Ito; Tohru Musha, and Kiichi Kato, all of Hachioji, Japan, assignors to Olympus Optical Co. Ltd., Japan

Filed Aug. 14, 1981, Ser. No. 292,929
Claims priority, application Japan, Aug. 19, 1980, 55-114464
Int. Cl.³ G01J 1/36; G11B 7/00
U.S. Cl. 369—45 **58 Claims**



1. A method for detecting a focussing error signal of an objective lens with respect to an object onto which a light spot is to be formed by means of said objective lens, comprising

focussing light emitted from a light source onto the object whereby light flux is returned from said object;

introducing at least a part of the returned light flux from the object into an optical member including an optical surface which reflects and refracts light flux from said object that is incident thereon, said optical member being formed of a material that has a higher refractive index than the medium into which said incident light flux is either refracted or transmitted; and

detecting variations in the distribution of either the reflected and refracted light flux at the periphery of said optical surface to produce a focussing error signal from the peripheral light flux.

4,422,169

LENS ASSEMBLY FOR A VIDEO RECORDER-PLAYBACK MACHINE

George Vitale, and Richard L. Wilkinson, both of Torrance, Calif., assignors to Discovision Associates, Costa Mesa, Calif.

Filed Oct. 20, 1980, Ser. No. 198,697
Int. Cl.³ G11B 7/00
U.S. Cl. 369—45 **23 Claims**

12. A lens assembly for focusing an optical beam upon an information storage disc in an information recorder-playback machine, comprising:

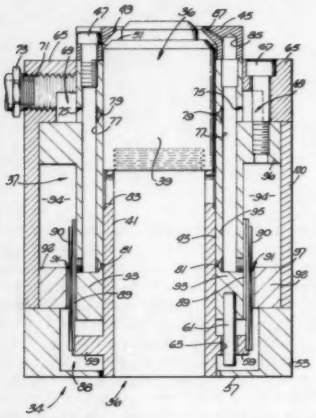
a generally cylindrical lens casing having a focusing lens mounted therein;

a generally cylindrical hollow lens holder secured to said casing and sized to have a diameter substantially common to the diameter of said casing, said lens holder including a plurality of circumferentially spaced openings formed therein defining exhaust vents adjacent said casing;

a housing of a magnetizable material including a cylindrical portion defining a central bore for sliding reception of said casing and said holder to accommodate movement of said casing and said holder toward and away from the disc, said cylindrical portion having formed therein a plurality of open flow risers extending generally in parallel with the axis of said cylindrical portion and spaced circumferentially about said cylindrical portion, and a plurality of flow orifices opening radially inwardly from each of said risers to the sliding interface between said casing and holder with said cylindrical portion within said bore, and a first plate extending radially outwardly from said cylindrical portion;

a manifold cover secured to said housing and cooperating therewith to define a manifold chamber in open flow communication with each of said flow risers, and including a port for connection to a supply of air under pressure for flow of the air through said port and into said manifold chamber, and further through said flow risers and said orifices to said sliding interface, a portion of the air exhausting through said exhaust vents;

a second plate of a magnetizable material disposed about one end of said cylindrical portion in radially spaced relation therewith, and in axially spaced relation with said first plate;



magnet means in magnetically coupled relation between said first and second plates for magnetizing said first plate and said cylindrical portion to have one polarity and said second plate to have an opposite polarity whereby said second plate and said cylindrical portion define an annular air gap about said cylindrical portion;

a flange projecting radially outwardly from said lens holder adjacent said one end of said cylindrical portion; and

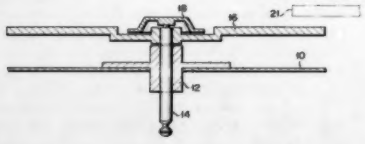
a current conducting coil assembly mounted on said flange for movement within said lens holder and including a current conducting coil within said air gap, said coil being for responding to variations in current passing therethrough to apply a force to said lens unit and thereby adjust the position of said lens unit within said housing.

4,422,170

TURNTABLE APPARATUS

Mitsuru Seno, Fukaya, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Feb. 18, 1982, Ser. No. 349,822
Claims priority, application Japan, Feb. 19, 1981, 56-21449[U]
Int. Cl.³ G11B *25/04*
U.S. Cl. 369—270 **9 Claims**



1. A turntable apparatus which bears and rotates a disc inserted into a reproducing apparatus for signals recorded on the disc through a disc inlet opening formed in the reproducing apparatus, comprising:

a chassis;

a turntable having a disc mounting surface, a recess in the central portion of said mounting surface and an under surface, said turntable being rotatably supported on said chassis to move vertically between a first position where said disc mounting surface is located below said disc inlet opening and a second position where said disc mounting surface is located above said disc inlet opening to bear the disc thereon;

a center spindle having a surface for regulating a disc mounting position, supported coaxially with an axis of rotation of said turntable, and received in said recess to move vertically between a third position where said surface for regulating the disc mounting position is located below said disc mounting surface and a fourth position where said surface for regulating the disc mounting position is located above said disc mounting surface to regulate the disc mounting position; and

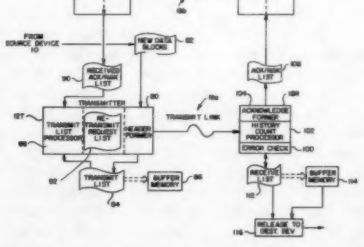
a moving mechanism for moving said center spindle from said third position to said fourth position as said turntable moves from said first position to said second position, and moving said center spindle from said fourth position to said third position as said turntable moves from said second position to said first position, said moving mechanism including at least one pin with its upper end attached to the center spindle and its lower end penetrating the bottom of the recess of the turntable to be led out downward, and at least one regulating member rockably mounted on the chassis and having a first portion capable of engaging the under surface of the turntable, the first portion and the pivotal point of the regulating member being spaced at a prescribed distance, and a second portion capable of engaging the pin, the second portion and the pivotal point being spaced at a distance greater than the prescribed distance.

4,422,171

METHOD AND SYSTEM FOR DATA COMMUNICATION

David L. Wortley, and Kenneth N. Larson, both of Thousand Oaks, Calif., assignors to Allied Corporation, Law Department, Morristown, N.J.

Filed Dec. 29, 1980, Ser. No. 221,058
Int. Cl.³ G08C *25/02*
U.S. Cl. 371—32 **14 Claims**



1. A system for transferring user data from a first station source to a second station destination via a communication path, said system comprising:

a transmitter connected to said first station source for transmitting data frames, each data frame comprising a bit stream defining an identification number, said identification number identifying the data frame and said bit stream including an information field for accommodating a block of user data originally supplied by said first station source device,

said first station transmitter including a transmit list means for storing a list of identification numbers, related to specific ones of said previously transmitted data frames,

said first station including buffer means for storing the said data blocks contained in the data frames previously transmitted and identified by said identification numbers stored in said transmit list means,

a receiver means located at said second station and coupled into said path for receiving data from said first station transmitter, said receiver means at said second station including means for receiving said data frames transmitted by said first station transmitter and for analyzing said received data frames to determine whether the received data frames need to be retransmitted,

said second station including transmitter means for transmitting data frames each comprising a bit stream, said second station transmitter bit stream containing acknowledgement data, said acknowledgement data including an identification number identifying the particular one of said data frames received from said first station transmitter and said second station transmitter means inserting in its said acknowledgement data, an acknowledgement code indicating whether or not the respective data frame should be repeated or not, and

said first station including a receiver means coupled to said path, said first station receiver means receiving said second station transmitted frames each comprising said bit stream,

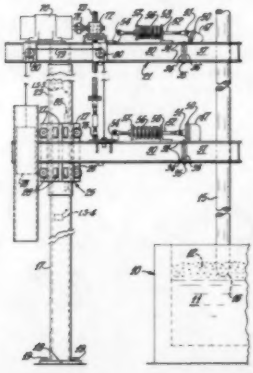
said first station including processor means connected to said first station receiver means and responsive to the acknowledgement data in said bit stream from said second station transmitting means and to said identification numbers in said transmit list for selectively retransmitting said data blocks identified thereby.

4,422,172

ELECTRODE SUPPORT MECHANISM AND METHOD

Charles S. Dunn, Pataskala, and Stephen Seng, Bladensburg, both of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Jan. 26, 1982, Ser. No. 342,870
Int. Cl.³ H05B 7/10
U.S. Cl. 373—94 **15 Claims**



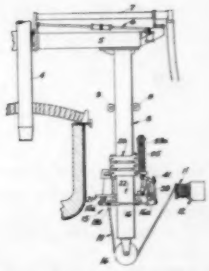
1. An electrode support for an arc-type furnace, comprising a vertical support post, a first support arm fixed to the post and cantilevered therefrom with its free end carrying electrode-engaging clamp means, a second support arm, means supporting said second arm on said post for vertical displacement relative thereto, said second arm being cantilevered from said support means with its free end carrying electrode-engaging clamp means vertically aligned with the clamp means of the first arm, and screw jack means interconnecting said arms for vertically displacing said second arm relative to said first arm.

4,422,173

ELECTRODE COLUMN SNUBBER FOR ELECTRIC ARC FURNACE ELECTRODES

Milton F. Dahlke, Pasadena, Tex., assignor to Armco Inc., Middletown, Ohio

Filed Mar. 15, 1982, Ser. No. 358,525
Int. Cl.³ F27D 11/10; H05B 7/10
U.S. Cl. 373—94 **21 Claims**



1. In an electric arc furnace construction of the type comprising a furnace vessel having a top opening, an electrode extending vertically through the opening into the vessel, a horizontally extending crosshead supporting at one end the upper end of the electrode, a vertically extending column connected to and supporting the opposite end of the crosshead at its upper end, said column being movable vertically to adjust the electrode height within the furnace vessel, and powered moving means for raising and lowering the column, the improvement in combination therewith comprising electrode column snubber means for catching the electrode column and structure attached thereto to prevent uncontrolled descent thereof in the event of failure of the moving means including:

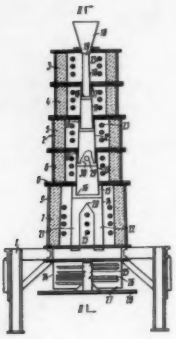
first and second clamp plates disposed on opposite sides of the column, respectively, each of said plates including means on its inner face for frictionally engaging the adjacent outer surface of the column when pressed thereagainst, said plates being movable between a first position out of contact with the outer surface of the column to permit vertical movement of the column, and a second position wherein said plates are forced against the outer surface of the column to prevent downward movement of the column; and

means for shifting said plates to said second position in the event of failure of said powered moving means which would otherwise allow the column to fall in an uncontrolled manner.

4,422,174
SHAFT FURNACE FOR HEAT TREATMENT OF MATERIALS

Dzhantore N. Abishev; Vitaly P. Malyshev; Ivan K. Bauer, all of Karaganda; Vladimir A. Yarygin, Balkhash; Mikhail E. Maisakov, Balkhash; Garifulla K. Gainutdinov, Balkhash; Alexandr M. Nazarov, Balkhash; Temirkhan A. Kusainov, Karaganda; Isaak A. Burovoi, Moscow, and Bulat N. Omarov, Karaganda, all of U.S.S.R., assignors to Khimiko-metallurgichesky Institut AN Kazakhskoi SSR, Karaganda, U.S.S.R.

PCT No. PCT/SU79/00094, § 371 Date May 28, 1981, § 102(e) Date May 22, 1981, PCT Pub. No. WO81/00906, PCT Pub. Date Apr. 2, 1981
PCT Filed Sep. 28, 1979, Ser. No. 269,018
Int. Cl.[3] H05B *3/00*
U.S. Cl. 373—115 4 Claims



1. A shaft furnace for heat treatment of material comprising:

a housing having a plurality of heating sections arranged in series over the vertical extent of the furnace, an upper section of said heating sections being arranged in the upper part of the furnace;

a downwardly flaring furnace shaft arranged within said housing;

tubular members arranged one in each of said sections along the longitudinal axis of said furnace, said tubular members having walls inclined at an angle of 3° to 4° to the longitudinal axis of said furnace, said tubular members forming interior spaces therebetween and having upper and lower portions, said tubular members having passages in said upper and lower sections, the flow areas of said passages of the lower portions of said tubular members of each of said sections being 20 to 25 percent smaller than the flow areas of said passages of the upper parts of the tubular members of the adjacent underlying sections, said lower portion of the tubular member in each of said sections being partially inserted into said upper portion of the tubular member of the adjacent underlying section, said lower and upper portions of the tubular members of said adjacent sections forming a gap, the size of said passage in the upper portion of the tubular member of said upper section ranging from 50×50 mm to 200×200 mm, the volume of said interior space of the tubular member of said upper section being 0.2 to 0.7 times that of the interior space of the tubular member of said adjacent underlying section;

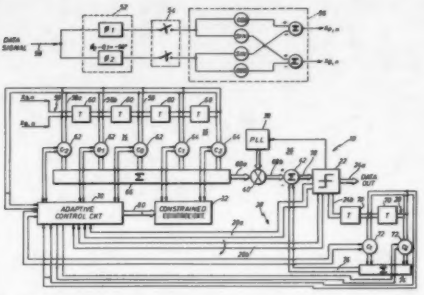
pockets provided in said upper portions of each of said tubular members; and

outlet pipes for discharging gaseous and vaporous fumes, said outlet pipes being connected with said pockets.

4,422,175
CONSTRAINED ADAPTIVE EQUALIZER

John A. C. Bingham, Palo Alto, and Jack H. Kurzweil, San Jose, both of Calif., assignors to Racal-Vadic, Inc., Sunnyvale, Calif.

Filed Jun. 11, 1981, Ser. No. 272,776
Int. Cl.[3] H04B *3/04*
U.S. Cl. 375—14 33 Claims



21. A constrained adaptive equalizer for quadrature amplitude modulation carrier type digital communication systems comprising:

a constrained transversal adaptive equalizer having a means for correcting leading echoes by approximating phase equalization of a received digital signal thereby generating a phase equalized signal;

a decision feedback equalizer having trailing multiplying coefficients for simulating trailing echoes in said phase equalized signal;

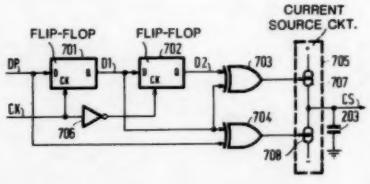
means for generating an equalized signal representing the difference between the phase equalized signal and said simulated trailing echoes; and

decision means adapted to receive said equalized signal for determining the value of said received digital signal and generating an output data signal indicative of that value.

4,422,176
PHASE SENSITIVE DETECTOR

Christopher P. Summers, London, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 27, 1981, Ser. No. 325,480
Claims priority, application United Kingdom, Dec. 12, 1980, 8039873; Dec. 12, 1980, 8039874
Int. Cl.[3] H03L *7/06*
U.S. Cl. 375—120 7 Claims



1. A phase sensitive detector for producing a control signal, which is indicative of phase discrepancy between data pulses of the NRZ type and clock pulses whose cycle period is equal to a data bit period and which can be used to correct the phase of the clock pulses to achieve a required phase relationship between the data pulses and the clock pulses, which phase sensitive detector comprises a first D-type flip-flop having a D input, a clock input and a logic output; characterized in that

said D input of said first D-type flip-flop is connected to receive said data pulses and said clock input is connected receive said clock pulses, and said phase sensitive detector further ccomprises a second D-type flip-flop having a D input connected to the logic output of said first D-type flip-flop, a clock input connected to receive said clock pulses via an inverter and a logic output, the logic outputs of said first and second D-type flip-flops being connected, respectively, to respective first inputs of first and second exclusive OR-gates, the outputs of which are connected to means for producing said control signal in accordance with logic values at these gate outputs.

4,422,177

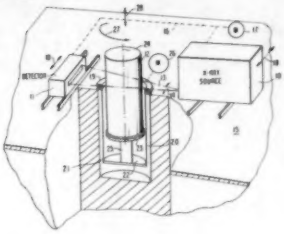
CT SLICE PROXIMITY ROTARY TABLE AND ELEVATOR FOR EXAMINING LARGE OBJECTS

Richard Mastronardi, Medford; Alan DeCew, Newtonville, and David McMahon, Malden, all of Mass., assignors to American Science and Engineering, Inc., Cambridge, Mass.

Filed Jun. 16, 1982, Ser. No. 388,879

Int. Cl.³ A61B *6/04*; G01N *23/04, 23/18*

U.S. Cl. 378—17 **14 Claims**



1. A Computerized Tomography system for inspecting large objects, comprising a rotary bearing having an inner diameter sufficiently large to encircle the object to be inspected, an elongated cup-like support structure attached to said bearing for rotation therewith, said support structure extending away from one face of said bearing in coaxial relation to said bearing, said support structure being adapted to receive and support an object to be examined with said object protruding outwardly of said support structure through said bearing and past the other face of said bearing, drive means coupled to said bearing for rotating said bearing, said support structure, and the object to be examined about the central axis of said bearing and support structure, a radiant energy source positioned to beam radiant energy toward the object to be examined in a direction transverse to the axis of rotation of said bearing, said beam passing through a diametral plane in said object closely adjacent to said bearing, detector means positioned adjacent said object for detecting the radiant energy opacity of said object at said dimetral plane thereof, and translation means for selectively displacing said object along the axis of said support structure and through said bearing, to change the diametral plane of the object being examined without changing the position of the diametral plane under examination relative to said bearing.

4,422,178

RADIO COMMUNICATION RECEIVER HAVING AN OSCILLATOR CIRCUIT OF LOWER POWER-CONSUMPTION

Toshihiro Mori, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan

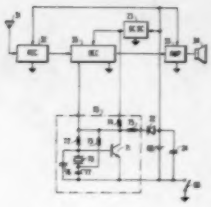
Filed Jan. 4, 1982, Ser. No. 336,988

Claims priority, application Japan, Jan. 20, 1981, 56-6292[U]

Int. Cl.³ H04B *1/16*

U.S. Cl. 455—343 **7 Claims**

1. A radio communication receiver comprising receiver means for demodulating received signals; decoding means for decoding the demodulated signals; oscillator means connected to said decoder means for generating a reference timing signal; first power source means having first voltage; second power source means having second voltage which is higher than said first voltage; power switch means connected to said first and



second power source means; and means connected between said first and second power source means for supplying said first voltage to said oscillator means in response to the turning-off of said power switch means and supplying said second voltage to said oscillator means in response to the turning-on of said power switch means.

4,422,179

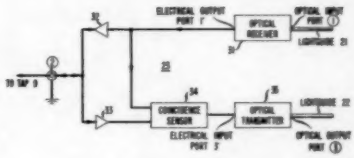
ELECTRICAL-OPTICAL INTERFACE NETWORK

Andres Albanese, Middletown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jul. 15, 1981, Ser. No. 283,434

Int. Cl.³ H04B *9/00*

U.S. Cl. 455—601 **6 Claims**



1. A network (**23**) for interfacing between an optical circuit (**20**) and an electrical circuit (**5,7,9**) comprising:

receiving means (**31**) for converting optical signals into electrical signals disposed between a first lightguide (**21**) in said optical circuit (**20**) and said electrical circuit (**5,7,9**);

transmitting means (**35**) for converting electrical signals into optical signals disposed between said electrical circuit (**5,7,9**) and a second lightguide (**22**);

and means (**32,33,34**), including a coincidence sensor, for preventing the transmission of signals between said two lightguides (**21,22**).

4,422,180

CONTROL SIGNAL TRANSMITTING APPARATUS, PARTICULARLY FOR AIRCRAFT

Hans J. Wendt, Buxtehude, Fed. Rep. of Germany, assignor to Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung, Munich, Fed. Rep. of Germany

Filed Aug. 17, 1981, Ser. No. 293,277

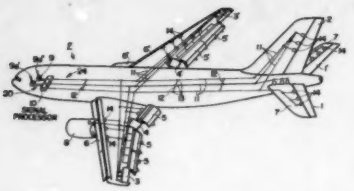
Claims priority, application Fed. Rep. of Germany, Sep. 2, 1980, 3032918; Mar. 25, 1981, 3111722

Int. Cl.³ H04B *9/00*

U.S. Cl. 455—603 **21 Claims**

1. In a system for transmitting control signals from a control source providing controlling signals to controlled units through signal light conductor network means operatively

interconnecting said control source and said controlled units, wherein a number of light conductors form redundant connection paths between said control source and said controlled units, the improvement comprising a first plurality of longitudinal light conductors and a further plurality of cross light conductors repeatedly intermeshing said longitudinal light conductors for forming said light conductor network means with a multitude of passive closed circuit paths intermeshed



with one another so that controlling signals can pass from said control source to a controlled unit even if some of these circuit paths should fail, said control source comprising means for producing said controlling signals in the form of digital light signals, signal processor means (**10**) including signal mixing means (**15**) and information processing means (**16, 17, 18**) operatively connected to said light conductor network means for addressing and actuating said controlled units.

4,422,181

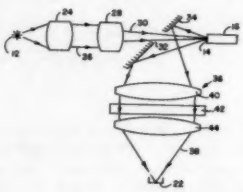
BI-DIRECTIONAL FIBRE-OPTIC COUPLER

David A. Grafton, Santa Monica; Eric B. Hochberg, Pasadena, and Ronald E. Purkis, Upland, all of Calif., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 26, 1980, Ser. No. 181,495

Int. Cl.³ H04B *9/00*

U.S. Cl. 455—606 **3 Claims**



1. A bi-directional coupler comprising an emitter source for emitting energy, collection and focusing optic means mounted for collecting energy from the emitter source and transmitting the energy in a narrow beam, a mirror having a reflective surface and a pinhole aperture therethrough and being mounted for passing said narrow beam through said pinhole aperture and to a flat and polished end surface of a fibre optic mounted normal to said narrow beam for receiving said narrow beam, said mirror surface being inclined relative to the end surface of said fibre optic for reflecting a second source of energy emanating from the end surface of said fibre optic, and detector and filter optic means mounted for receiving reflected sound source energy from the reflective surface of the mirror and filtering out undesirable energy and focusing the remainder of the energy onto a detector mounted for reception thereof, said collection and focusing optic means including collection optics that collect as much flux from said emitter source as possible and transmits this flux as a collimated light means to focusing optics of said collection and focusing optic means, said focusing optics producing said narrow beam as a narrow, near collimated beam that is transmitted to said end surface of said fibre, and said flat and polished end surface being positioned about one inch from said pinhole aperture, whereby a portion of said narrow, near collimated beam is reflected back upon itself toward said emitter source, through said pinhole aperture and out of the field of view of said detector.

4,422,182

DIGITAL MICROPHONE

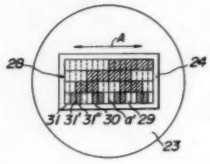
Hideyuki Kenjyo, Koganei, Japan, assignor to Olympus Optical Co. Ltd., Japan

Filed Mar. 4, 1982, Ser. No. 354,702

Claims priority, application Japan, Mar. 12, 1981, 56-33380[U]

Int. Cl.³ H04B *9/00;* **H04R** *7/00, 23/00*

U.S. Cl. 455—614 **18 Claims**



1. A digital microphone for converting an incident acoustic energy into an electric signal comprising:

a housing having an opening portion;

means fixedly provided in the housing for emitting a radiation beam;

a vibrating means provided at the opening portion of the housing in a vibratory manner for converting the acoustic energy into a mechanical displacement;

means mechanically coupled with the vibrating means for reflecting the radiation beam;

means fixedly provided in the housing for transducing the radiation beam reflected by the reflecting means into the electric signal; and

means having a code pattern and provided between the reflecting means and the transducing means for modulating the radiation beam in accordance with a variation of relative position of the code pattern and the radiation beam due to a displacement of the reflecting means wherein the reflecting means is constructed integrally with the vibrating means, and the modulating means is mounted on the reflecting means; whereby the electric signal which constitutes a digital signal designating the displacement of the vibrating means is directly obtained from the transducing means.

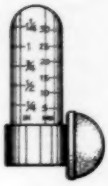
DESIGNS

DECEMBER 20, 1983

271,819
BABY SHOE
Jane E. Rhomberg, 1801 Baywood La., Davis, Calif. 95616
Filed Feb. 19, 1981, Ser. No. 235,978
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—278

271,820
BELT ATTACHED CONTAINER HOLDER
Donald K. Allen, Paw Paw, Ill., assignor to Mark Anderson, Elmwood, Wis.
Filed Jan. 11, 1982, Ser. No. 338,343
Term of patent 14 years
Int. Cl. D02—*07*
U.S. Cl. D2—400

271,821
SEWING AID
Shirley J. P. Kelson, 9238 35th Ave., S.W., Seattle, Wash. 98126
Filed Jun. 15, 1981, Ser. No. 273,980
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D3—18



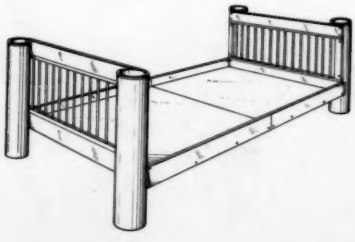
271,822
CAMERA CASE
Bruce N. Clancy, 520 Avenue B, #10, Redondo Beach, Calif. 90277
Filed Jul. 6, 1981, Ser. No. 280,698
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D3—33

271,823
DUFFEL SATCHEL
Raymond Waites, New York, N.Y., assignor to Gear, Inc., New York, N.Y.
Filed Sep. 28, 1981, Ser. No. 306,395
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D3—71

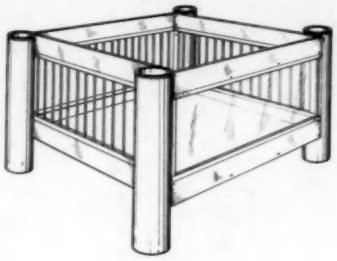
271,824
HELIODON-TYPE DEVICE
Jon Massaro, 2152 Stoneyvale Ave., Tujunga, Calif. 91042
Continuation-in-part of Ser. No. 946,805, Sep. 28, 1978, abandoned. This application Jun. 16, 1980, Ser. No. 159,942
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—27

271,825
CHAIR
Warren H. Snodgrass, 223 Woodland Rd., Kentfield, Calif. 94904
Continuation-in-part of Ser. No. 61,485, Jul. 27, 1979. This application Aug. 30, 1982, Ser. No. 412,847
The portion of the term of this patent subsequent to Jan. 11, 1983, has been disclaimed.
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—69

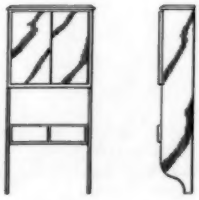
271,826
BED
James R. Hull, 148 S. Westgate Ave., Los Angeles, Calif. 90049
Filed Jan. 26, 1981, Ser. No. 228,092
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—81



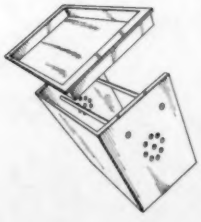
271,827
BED
James R. Hull, 148 S. Westgate Ave., Los Angeles, Calif. 90049
Filed Jan. 26, 1981, Ser. No. 228,093
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—81



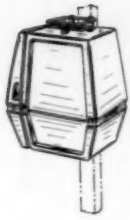
271,828
TOILET-BIDET CABINET
Gregory Wolf, West Reading; Scott Sandman, Fleetwood, and Clark Pearson, Birdsboro, all of Pa., assignors to The Tappan Company, Mansfield, Ohio
Filed May 26, 1981, Ser. No. 266,911
Term of patent 14 years
Int. Cl. D06—*04*
U.S. Cl. D6—86



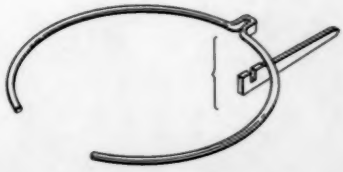
271,829
COMBINED SOAP AND RAG HOLDER
Arlene L. Mathews, 7634 Long, Shawnee Mission, Kans. 66216
Filed Apr. 17, 1981, Ser. No. 255,104
Term of patent 14 years
Int. Cl. D06—*04*
U.S. Cl. D6—89



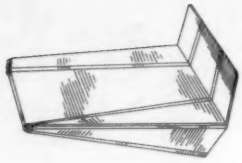
271,830
WINDSHIELD WIPER PRODUCTS CABINET
Marvin L. Adenau, Hoffman Estates, Ill., assignor to Advertising Metal Display Company, Chicago, Ill.
Division of Ser. No. 97,728, Nov. 26, 1979, Pat. No. 265,533.
This application Sep. 2, 1981, Ser. No. 298,730
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—127



271,831
SUPPORT BRACKET FOR A FLOWER POT OR SIMILAR ARTICLE
Peter D. McGain, 42 Mills St., Albert Park, Victoria, Australia
Filed Jul. 17, 1979, Ser. No. 58,368
Claims priority, application Australia, Mar. 9, 1979, 77281; Mar. 9, 1979, 77282
Term of patent 14 years
Int. Cl. D6—*06*; D8—*08*
U.S. Cl. D6—137

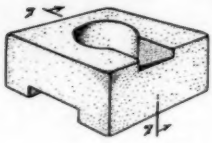


271,832
COLLAPSIBLE ARTICLE SUPPORT OR SIMILAR ARTICLE
Donald B. Smith, R.R. No. 1, Mount Brydges, Ontario, Canada (N0L 1W0)
Division of Ser. No. 56,812, Jul. 12, 1979. This application Apr. 20, 1981, Ser. No. 255,426
Claims priority, application Canada, Jun. 4, 1979, 04-06-79-6
Term of patent 14 years
Int. Cl. D06—*99*
U.S. Cl. D6—180



271,833
COMBINED VASE AND SUPPORT BRACKET THEREFOR
Donald Okada, 711 W. 17th St., Suite D-7, Costa Mesa, Calif. 92627
Filed Dec. 17, 1981, Ser. No. 331,655
Term of patent 14 years
Int. Cl. D6—*06;* D11—*02;* D7—*06*
U.S. Cl. D6—182

271,834
CUSHION
Daniel F. Huntsinger, 15253 Jupiter St., Whittier, Calif. 90603
Filed Oct. 7, 1980, Ser. No. 194,767
Term of patent 14 years
Int. Cl. D6—*09*
U.S. Cl. D6—201



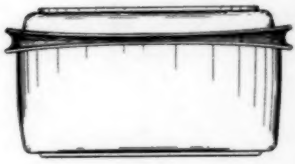
271,835
FOOD BOWL
Lawrence M. Knutson, Prior Lake, Minn., assignor to Decra Stone, Inc., Prior Lake, Minn.
Filed Jun. 20, 1980, Ser. No. 161,314
Term of patent 14 years
Int. Cl. D07—*01*
U.S. Cl. D7—29

271,836
COMBINED PILL GRATER AND DRINKING STRAW
Robert N. Border, Box 270, Verdugo City, Calif. 91046
Filed Jun. 22, 1981, Ser. No. 275,893
Term of patent 14 years
Int. Cl. D07—*06*
U.S. Cl. D7—42

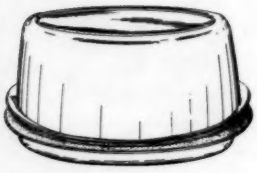
271,837
Patent Not Issued For This Number

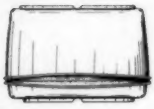
271,838
FORK OR SIMILAR ARTICLE OF FLATWARE
David Rogers, Barrington, R.I., assignor to Textron Inc., Providence, R.I.
Filed Nov. 19, 1981, Ser. No. 322,777
Term of patent 14 years
Int. Cl. D07—*03*
U.S. Cl. D7—137

271,839
INVERTIBLE CASSEROLE-ROASTER OR THE LIKE
Robert M. Powers, Grand Rapids, Mich., assignor to Amway Corporation, Ada, Mich.
Filed Apr. 9, 1981, Ser. No. 252,411
Term of patent 14 years
Int. Cl. D07—*02*
U.S. Cl. D7—327

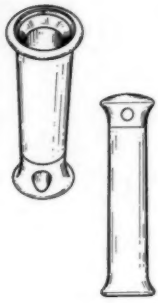


271,840
ROASTER
Robert M. Powers, Grand Rapids, Mich., assignor to Amway Corporation, Ada, Mich.
Filed Apr. 9, 1981, Ser. No. 252,409
Term of patent 14 years
Int. Cl. D07—*02*
U.S. Cl. D7—360



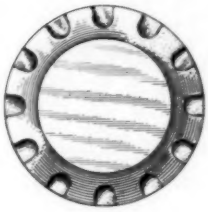


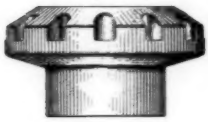
271,841
HANDLE FOR KITCHEN UTENSILS
Erik L. Hansen, Roskilde, Denmark, assignor to Rosti Plastic A/S, Ballerup, Denmark
Filed Jan. 8, 1982, Ser. No. 338,398
Claims priority, application United Kingdom, Jul. 16, 1981, 811001525
Term of patent 14 years
Int. Cl. D07—*02, 04*
U.S. Cl. D7—395



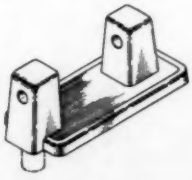
271,842
SPLITTING HEAD FOR A WOOD SPLITTING MACHINE
L. Douglas Nickerson, 306 Reid St., Sault Ste. Marie, Ontario, Canada (P6B 4V1)
Filed May 11, 1981, Ser. No. 262,485
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—47

271,843
KNOB
Irwin J. Ferdinand, Glencoe; Richard Sylvan, Glenview, and Michael Peterson, Evanston, all of Ill., assignors to Hirsh Company, Skokie, Ill.
Filed Aug. 19, 1981, Ser. No. 294,350
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—312





271,844
HANDLE STUD FOR AN ARTICLE OF LUGGAGE OR THE LIKE
Edward M. Stolarz, Yorktown Heights, N.Y., assignor to Presto Lock, Inc., Garfield, N.J.
Filed Feb. 12, 1981, Ser. No. 233,637
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—321

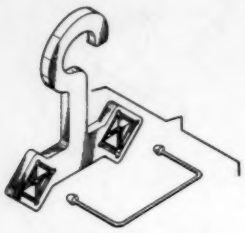


271,845
DOOR CLOSER
Yoshihiko Matsuo, Yokohama, and Takeshi Shohoji, Funabashi, both of Japan, assignors to Ryobi Limited, Hiroshima, Japan
Filed Apr. 24, 1981, Ser. No. 257,201
Claims priority, application Japan, Nov. 4, 1980, 55-46256
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—330

271,846
SUPPORT FOR CONCRETE REINFORCEMENT BAR
Ernest Hernandez, 1237 Thackery, West Covina, Calif. 91790
Filed Mar. 9, 1981, Ser. No. 241,929
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—356

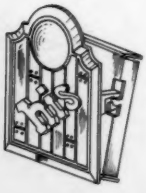
271,847
CONCRETE REINFORCEMENT BAR SUPPORT
Ernest Hernandez, 1237 Thackery, West Covina, Calif. 91790
Filed May 18, 1981, Ser. No. 264,360
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—356

271,848
TAMPER-PROOF FASTENING DEVICE FOR TAGS AND THE LIKE
John K. Tcherneshoff, Fort Payne, Ala., assignor to Tcherneshoff Associates, Inc., Fort Payne, Ala.
Filed Dec. 8, 1980, Ser. No. 214,328
Term of patent 14 years
Int. Cl. D6—*08;* D8—*08*
U.S. Cl. D8—373



271,849
FIRE STOP FOR USE BETWEEN WALL STUDS
Kendall C. Kunz, Box 1292, Idyllwild, Calif. 92349
Filed Apr. 29, 1981, Ser. No. 258,683
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—384

271,850
MAGNETIC CLIP
Ruediger Einhorn, Katonah, and Lee R. Chasen, Port Chester, both of N.Y., assignors to Coats & Clark, Inc., Stamford, Conn.
Division of Ser. No. 199,838, Oct. 23, 1980. This application Feb. 16, 1983, Ser. No. 466,866
Term of patent 14 years
Int. Cl. D8—*08;* D19—*02*
U.S. Cl. D8—395



271,851
TUBE CLAMP
Mark A. Lance, Pascoe Vale South, Australia, assignor to W. A. Deutsher Pty. Ltd., Moorabbin, Australia
Filed Aug. 28, 1981, Ser. No. 297,397
Claims priority, application Australia, Mar. 13, 1981, 83590
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—396

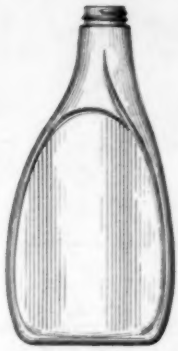
271,852
COMBINED BOTTLE AND SUPPORT BRACKET THEREFOR
Keiu Kimura, Higashi-Osaka, Japan, assignor to Osaka Grip Mfg. Co., Ltd., Osaka, Japan
Filed Jun. 5, 1981, Ser. No. 271,003
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—337

271,853
BOTTLE
Tokumitsu Tsuno, Yokohama, Japan, assignor to Yakult Honsha Co., Ltd., Japan
Filed Apr. 30, 1981, Ser. No. 259,146
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—349

271,854
CAN BODY
Christopher Berry, Wantage, England, assignor to Metal Box Limited, Reading, England
Filed Aug. 28, 1981, Ser. No. 297,494
Claims priority, application United Kingdom, Mar. 18, 1981, 999513
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—351

271,855
BOTTLE OR THE LIKE
James L. Thrush, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio
Division of Ser. No. 140,180, Apr. 14, 1980. This application May 17, 1982, Ser. No. 378,635
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—370

271,856
BOTTLE
John I. Suhajda; Robert E. Corbs; Richard L. Davenport, and Allen D. Miller, all of Racine, Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.
Filed Oct. 26, 1981, Ser. No. 314,892
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—375

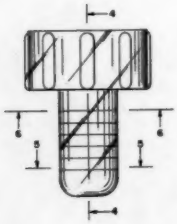


271,857
CUP LID
Paul V. Callahan, P.O. Box 112, Balfour, N.C. 28706
Filed May 11, 1981, Ser. No. 262,625
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—438

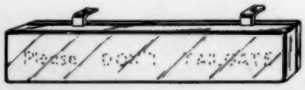
271,858
CAN LID
Walter S. Martin, Box 206, Rte. 2, Pekin, Ind. 47165, and Cleo B. Terrell, Pekin, Ind., assignors to Walter S. Martin, Pekin, Ind.
Filed Jun. 2, 1981, Ser. No. 269,654
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—447

271,859
COMBINED INSIDE AND OUTSIDE THERMOMETER
William Polson, 213 Nagle Ave., Apt. 4L, New York, N.Y. 10034
Filed Dec. 16, 1980, Ser. No. 216,921
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—58

271,860
SEDIMENT INDICATOR
Robert V. Albertson, 2100 Shadywood Rd., Wayzata, Minn. 55391
Filed Jan. 23, 1981, Ser. No. 227,789
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—96

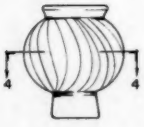


271,861
SIGN
Frederick K. Patton, 7 Black Duck Dr., Center Moriches, N.Y. 11934
Continuation of Ser. No. 38,234, May 11, 1979, abandoned. This application Jul. 14, 1982, Ser. No. 398,371
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—114



271,862
MEDICAL SERVICE EMBLEM
Dorothy Boyd, 11230 S. Vernon, Chicago, Ill. 60628
Filed Nov. 9, 1981, Ser. No. 319,308
Term of patent years
Int. Cl. D11—*03*
U.S. Cl. D11—105

271,863
CONTAINER FOR FLOWERS, PLANTS OR THE LIKE
Marie P. Kowalik, Troy, Mich., assignor to Florists' Transworld Delivery Association, Southfield, Mich.
Filed Jul. 29, 1981, Ser. No. 288,032
Term of patent 14 years
Int. Cl. D11—*02;* D7—*01;* D26—*01*
U.S. Cl. D11—152



271,864

INTEGRAL TRUCK CAB WINDSHIELD ROOF AND DEFLECTOR UNIT

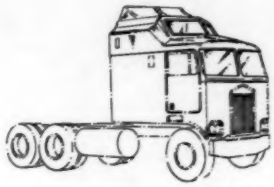
Timothy J. Kangas, Issaquah, Wash., assignor to PACCAR Inc., Bellevue, Wash.

Filed Oct. 22, 1979, Ser. No. 87,244

Term of patent 14 years

Int. Cl. D12—*08*

U.S. Cl. D12—96



271,865

MOTORCYCLE

Minoru Morioka, Kawagoe; Yoshitaka Omori, Tsurugashima, and Mamoru Matsui, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

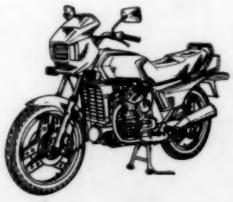
Filed Apr. 3, 1981, Ser. No. 250,599

Claims priority, application Japan, Oct. 8, 1980, 55-41954

Term of patent 14 years

Int. Cl. D12—*11*

U.S. Cl. D12—110



271,866

COMBINED SISSY BAR AND BACKREST PAD

Mark Turkington, and Philip Turkington, both of Willimantic, Conn., assignors to Connecticut Cycle Accessories, Inc., Willimantic, Conn.

Filed Jul. 20, 1981, Ser. No. 284,604

Term of patent 14 years

Int. Cl. D12—*11*

U.S. Cl. D12—119

271,867

MOTORCYCLE BACKREST

Bernard Danielson, 12007 Hwy. 55, Minneapolis, Minn. 55441

Filed Oct. 22, 1981, Ser. No. 314,031

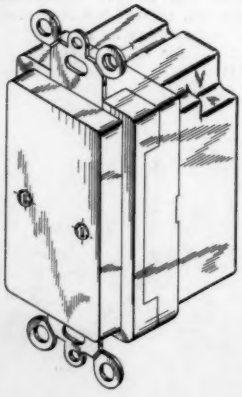
Term of patent 14 years

Int. Cl. D12—*11*

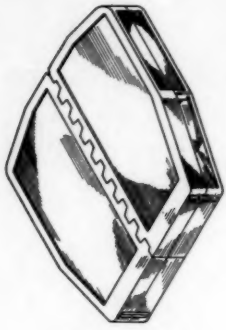
U.S. Cl. D12—119

271,868
COLLAPSIBLE STROLLER
Charles L. Voytko, and Robert J. Boudreau, both of Bedford, Pa., assignors to Brown Group Recreational Products, Inc., Bedford, Pa.
Filed Jan. 22, 1981, Ser. No. 227,153
Term of patent 14 years
Int. Cl. D12—*12*
U.S. Cl. D12—129

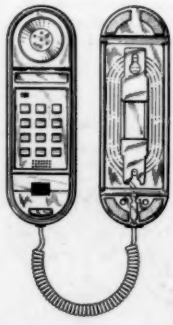
271,869
ELECTRONIC RECEPTACLE HOUSING
Richard C. Doyle, Greenlawn; Lester Rivera, Glendale, and Saul Rosenbaum, East Meadow, all of N.Y., assignors to Leviton Manufacturing Co., Inc., Little Neck, N.Y.
Filed Oct. 7, 1981, Ser. No. 309,354
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—30



271,870
MAGNETIC TAPE CASSETTE
Klaus Schoettle, 70 Ladenburger Strasse, 6900 Heidelberg; Volker Richter, 34 Karl-Christ Strasse, 6900 Heidelberg 25, and Heinrich Wittkamp, 33 Staudenweg, 6800 Mannheim, all of Fed. Rep. of Germany
Filed Feb. 6, 1979, Ser. No. 9,794
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—11

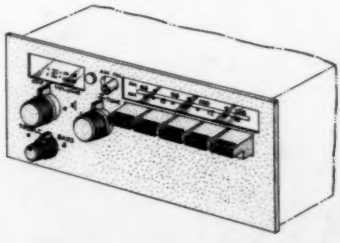


271,871
COMBINED TELEPHONE HANDSET AND BASE THEREFOR
Yoshiharu Shimizu, Ichihara, Japan, assignor to Arrow Trading Co., Inc., New York, N.Y.
Filed Mar. 4, 1983, Ser. No. 472,231
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—53

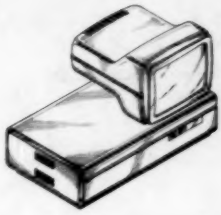


271,872
WALL TELEPHONE BASE HOUSING
George M. Janda, Wheaton, Ill., assignor to GTE Automatic Electric Labs Inc., Northlake, Ill.
Filed Oct. 1, 1981, Ser. No. 307,678
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—61

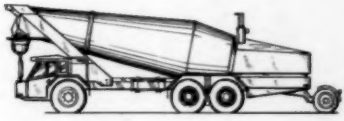
271,873
RADIO CONTROL UNIT
Walter K. Gierschick, West Bloomfield, and Keith Kesling, Utica, both of Mich., assignors to General Motors Corporation, Detroit, Mich.
Filed Jun. 29, 1981, Ser. No. 277,678
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—76



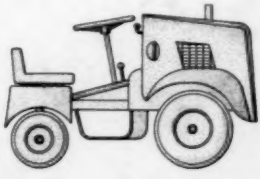
271,874
COMPUTER DISPLAY TERMINAL
Evert Endt, Paris, France, assignor to Thomson-CSF, Paris, France
Filed Jan. 21, 1981, Ser. No. 226,661
Claims priority, application Hague, Jul. 21, 1980, 000276
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D14—113



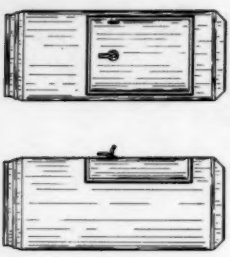
271,875
FRONT DISCHARGE MIXER TRUCK WITH AUXILIARY REAR AXLE
Frederick J. Silbernagel, 148-7th SE., Huron, S. Dak. 57350
Filed Mar. 25, 1981, Ser. No. 247,615
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—19



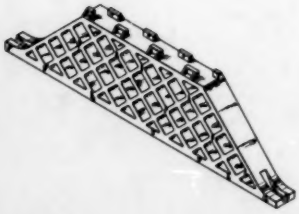
271,876
TRACTOR
Albert E. Browning, Rte. 4, Box 425, Winnsboro, La. 71295
Filed Oct. 20, 1980, Ser. No. 198,961
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—23



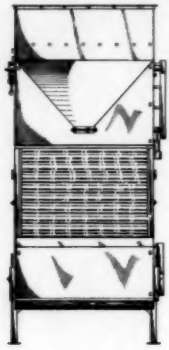
271,877
REFRIGERATOR WITH BEVERAGE DISPENSER
Harvey B. Hoff, 5440 Franklin, Boise, Id. 83704
Filed Jun. 29, 1981, Ser. No. 278,875
Term of patent 14 years
Int. Cl. D15—*07*
U.S. Cl. D15—81



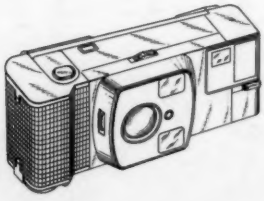
271,878
CONNECTOR FOR MOLDS USED IN THE MANUFACTURE OF CONCRETE CEILINGS
Moshe Farbi, 4a Givat Downs St., Haifa, Israel
Filed Aug. 5, 1980, Ser. No. 175,416
Claims priority, application Israel, Feb. 28, 1980, 8068
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—138



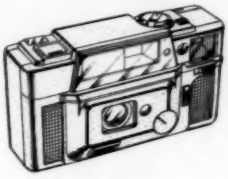
271,879
HOUSING FOR PNEUMATIC SEPARATOR
David R. Neilson, 809 Second St., Woodland, Calif. 95695
Filed Aug. 7, 1978, Ser. No. 931,820
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—147



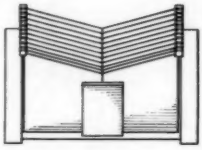
271,880
CAMERA
Nobuhiro Agou, and Mutsuhide Matsuda, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 30, 1983, Ser. No. 480,335
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—1



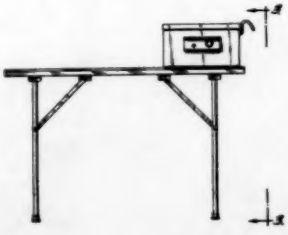
271,881
CAMERA
Takaharu Kato, Tokyo, Japan, assignor to Ricoh Company, Ltd., Japan
Filed Nov. 5, 1981, Ser. No. 318,423
Claims priority, application Japan, May 6, 1981, 56-19355
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—6



271,882
UNIVERSAL SORTER
R. Clark DuBois, Fairfield, and John C. Hamma, Milford, both of Conn., assignors to Gradco/Dendoki, Inc., Santa Ana, Calif.
Filed Oct. 3, 1980, Ser. No. 193,423
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D16—32

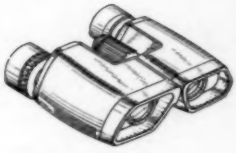


271,883
EXPOSURE UNIT FOR LITHOGRAPHIC PLATES
Gerold Litschi, Lansdale, Pa., assignor to Master Etching Machine Company, Ambler, Pa.
Filed Sep. 14, 1981, Ser. No. 302,204
Term of patent 14 years
Int. Cl. D16—*04*
U.S. Cl. D16—33

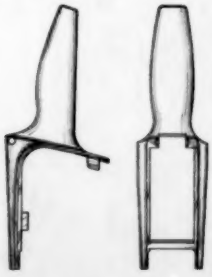


271,884
EYEGLASSES
Angelo De Mejo, Belluno, Italy, assignor to G.D.S. International S.r.l., Belluno, Italy
Filed Aug. 19, 1981, Ser. No. 294,247
Claims priority, application Italy, Mar. 20, 1981, 61934/81[U]
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—116

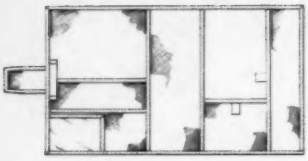
271,885
BINOCULARS
Giorgetto Giugiaro, Turin, Italy, assignor to Nippon Kogaku K.K., Tokyo, Japan
Filed Nov. 20, 1980, Ser. No. 208,783
Claims priority, application Japan, May 24, 1980, 55-20548
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—133



271,886
HANDLE FOR A LABELLING APPARATUS
Wolfgang Reinke, Rothenberg, Fed. Rep. of Germany, assignor to Esselte Pendaflex Corporation, Garden City, N.Y.
Filed Dec. 17, 1980, Ser. No. 217,529
Claims priority, application Switzerland, Jul. 4, 1980, 111271
Term of patent 14 years
Int. Cl. D18—*99*
U.S. Cl. D18—19



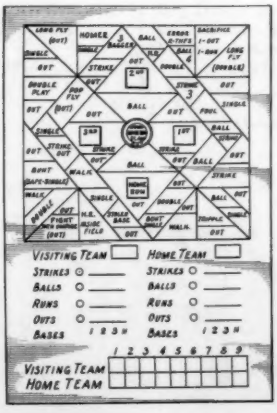
271,887
BOOK COVER
Caldwell Williams, 179 Barrington Pl., Brentwood Village, Los Angeles, Calif. 90049, assignor to Caldwell Williams, Los Angeles, Calif.
Filed Sep. 21, 1981, Ser. No. 304,176
Term of patent 14 years
Int. Cl. D19—*04*
U.S. Cl. D19—26



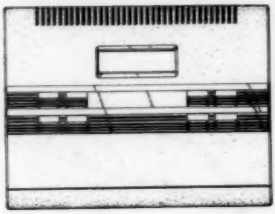
271,888
BOOKMARK
Michael Dolas, 1164 Crestline, Santa Barbara, Calif. 93105
Filed Mar. 17, 1982, Ser. No. 359,177
Term of patent 14 years
Int. Cl. D19—*99*
U.S. Cl. D19—34

271,889
MARKING INSTRUMENT
Peter A. Krückel, Heroldsberg, and Gerhard Möck, Kirchehrenbach, both of Fed. Rep. of Germany, assignors to Schwan-Stabilo Schwanhausser GmbH & Co., Nuremberg, Fed. Rep. of Germany
Filed Nov. 12, 1981, Ser. No. 320,850
Claims priority, application Fed. Rep. of Germany, Jun. 4, 1981, MR VI 497
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—43

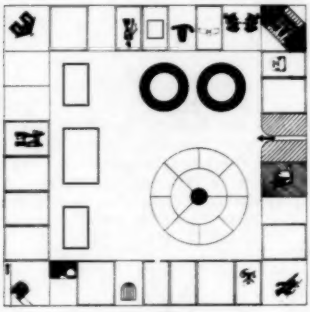
271,890
DART BASEBALL GAME BOARD
A. Carl Astwood, Sr., 314 Duane Ave., Schenectady, N.Y. 12307
Filed Oct. 28, 1981, Ser. No. 315,908
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—6



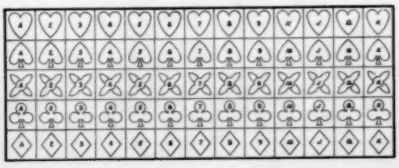
271,891
VIDEO GAME CONSOLE
William J. Renteria, San Jose, Calif., assignor to Atari, Inc., Santa Clara, Calif.
Filed Jan. 7, 1982, Ser. No. 337,884
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—13



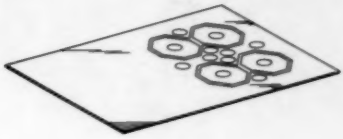
271,892
GAME BOARD
Steven M. Engel, 6480 Evergreen Ave., Apt. 302, Portage, Ind. 46368
Filed Oct. 9, 1981, Ser. No. 309,992
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—25



271,893
CASINO GAME BOARD
Frank J. Wirken, 9538 Ash, Overland Park, Kans. 66207
Filed Oct. 8, 1980, Ser. No. 195,119
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—26

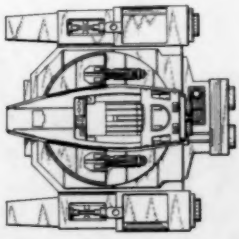


271,894
GAME BOARD
Frank Sims, 309-340 8th St., New Westminster, British Columbia, Canada
Filed Sep. 18, 1981, Ser. No. 303,562
Claims priority, application Canada, Sep. 14, 1981, 14-01-81-9
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—34



271,895
BINGO-CARD HOLDER
William E. Runions, 4859 W. 131st St., Hawthorne, Calif. 90250
Filed Oct. 19, 1981, Ser. No. 312,429
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—54

271,896
SPACE TOY
Kenneth R. Wilkes, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Feb. 4, 1982, Ser. No. 345,745
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—87

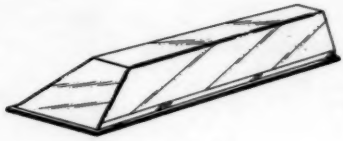


271,897
STACKING TOY
Hassan Ma, Hoffman Estates, Ill., assignor to Milton Bradley International, Inc., Springfield, Mass.
Filed Mar. 19, 1981, Ser. No. 245,621
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—104

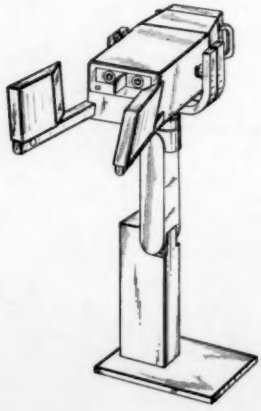
271,898
TOY PUZZLE
Peggy J. Hees, Oak Park, Ill., assignor to Milton Bradley International, Inc., Springfield, Mass.
Filed Mar. 19, 1981, Ser. No. 245,622
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—105

271,899
GAME PADDLE
Maurice G. Hillesheim, Belleville, St. Clair County, Ill.
Division of Ser. No. 882,554, Mar. 1, 1978, abandoned. This application Nov. 5, 1980, Ser. No. 204,481
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—211

271,900
VENTILATION DEFLECTOR UNIT
Ernest Efstratis, 6775 Wing Lake Rd., Birmingham, Mich. 48010
Filed Jun. 11, 1981, Ser. No. 272,711
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—138

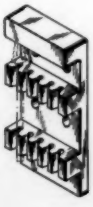


271,901
OPTICAL MEASURING INSTRUMENT
Donald Waslander, Paris, France, assignor to Essilor International (Compagnie Generale d'Optique), Creteil, France
Filed Apr. 28, 1981, Ser. No. 258,538
Claims priority, application France, Nov. 4, 1980, 803397
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—1.1



271,902
EMBALMING TROCAR STERILIZER
Charles H. Campton, 525 Delaware Ave., Palmerton, Pa. 18071
Filed Feb. 26, 1981, Ser. No. 238,559
Term of patent 14 years
Int. Cl. D24—*09*
U.S. Cl. D24—09

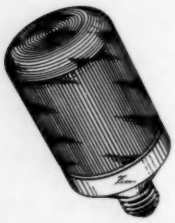
271,903
SURGICAL BONE BURRING BIT RACK
Jack W. Kaufman, 357 Frankel Blvd., Merrick, N.Y. 11566
Filed Mar. 6, 1981, Ser. No. 241,123
Term of patent 14 years
Int. Cl. D24—*02*; D6—*04*
U.S. Cl. D24—31



271,904
ANGIO-CATHETER/INFUSION TUBING LOCK
Annabelle D. Tucker, 4480 Sherman Oaks Cir., Sherman Oaks, Calif. 91403
Filed Jul. 31, 1980, Ser. No. 174,206
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—54

271,905
EXPANSION JOINT SEALING STRIP
Neil S. Golden, Los Angeles, Calif., assignor to Albert H. Allen, Beverly Hills, Calif.
Filed Oct. 27, 1981, Ser. No. 315,644
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—74

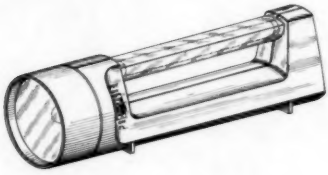
271,906
LAMP
Fritz E. Zabransky, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Jul. 24, 1980, Ser. No. 171,915
Claims priority, application Benelux, Jan. 29, 1980, 54388-01; Jan. 29, 1980, 54388-02
Term of patent 14 years
Int. Cl. D26—*04*
U.S. Cl. D26—2



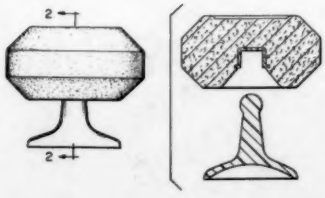
271,907
COMPACT FLUORESCENT LAMP
Masumi Nanba, Funabashi, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Japan
Filed Dec. 23, 1981, Ser. No. 333,888
Claims priority, application Japan, Dec. 18, 1980, 55-52553
Term of patent 14 years
Int. Cl. D26—*4*
U.S. Cl. D26—3

271,908
LAMP
Yoshio Kojima, Yokohama; Masumi Nanba, Funabashi, and Hisaaki Katoh, Zushi, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Japan
Filed Dec. 23, 1981, Ser. No. 333,907
Claims priority, application Japan, Aug. 27, 1981, 56-37494
Term of patent 14 years
Int. Cl. D26—*04*
U.S. Cl. D26—3

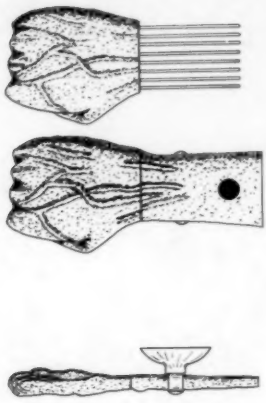
271,909
FLUORESCENT LANTERN
Henry R. Mallory, Greenwich, Conn., assignor to Duracell Inc., Bethel, Conn.
Filed Dec. 18, 1980, Ser. No. 217,592
Term of patent 14 years
Int. Cl. D26—*02*
U.S. Cl. D26—42



271,910
COMBINED SOAP BAR AND HOLDER
Henry Blaszkowski, P.O. Box 114, Southfield, Mich. 48034
Continuation-in-part of Ser. No. 60,279, Jul. 25, 1979, Pat. No. Des. 263,885. This application Nov. 2, 1981, Ser. No. 316,785
Claims priority, application Canada, Jan. 25, 1980, 25-01-80-3; Apr. 22, 1981, 25-01-80-16; Apr. 22, 1981, 25-01-80-17
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—8.1

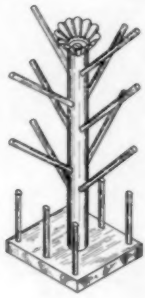


271,911
COMBINED COMB AND SHEATH
James R. Hunt, 115 River Dr., Cocoa, Fla. 32922
Filed Apr. 27, 1981, Ser. No. 257,890
Term of patent 14 yrs.
Int. Cl. D28—*03*
U.S. Cl. D28—22



271,912
HORSESHOE
Larry Kurpakus, R.D. #2, Ridge Rd., Gibsonia, Pa. 15044
Filed Oct. 1, 1981, Ser. No. 307,185
Term of patent 14 years
Int. Cl. D30—*95*
U.S. Cl. D30—35

271,913
BABY BOTTLE DRYING RACK
William J. Nanfito, and Joann K. Nanfito, both of 7614 N. 33rd St., Omaha, Nebr. 68112
Filed Oct. 5, 1981, Ser. No. 308,407
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D32—55



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 20TH DAY OF DECEMBER, 1983

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Nattermann & Cie. GmbH: *See*—
Ghyczy, Miklos; Erdos, Adorjan; and Heidemann, Gunter, 4,421,747., Cl. 424-199.000.

Abarotin, Eugene V.; and Bonk, Leroy V., to United States Steel Corporation. Sliding gate valve having adjustable seal pressure. 4,421,256., Cl. 222-600.000.

Abbott, Barry J.; and Silcox, William H., to Chevron Research Company. Sliding leg tower. 4,421,438., Cl. 405-227.000.

Abbott Laboratories: *See*—
Arbir, Francis W.; Raden, Daniel S.; Narducy, Kenneth W.; and Casati, Francois M., 4,421,673., Cl. 502-167.000.
Arbir, Francis W.; Raden, Daniel S.; and Narducy, Kenneth W., 4,421,869., Cl. 521-126.000.

Abel, William A.: *See*—
Massey, Lester G.; George, David A.; Brabets, Robert I.; and Abel, William A., 4,421,722., Cl. 422-129.000.

Abex Corporation: *See*—
Hieronymi, Gabriel C.; and Hansen, Randall C., 4,420,954., Cl. 70-150.000.

Abishev, Dzhantore N.; Malyshev, Vitaly P.; Bauer, Ivan K.; Yarygin, Vladimir A.; Maisakov, Mikhail E.; Gainutdinov, Garifulla K.; Nazarov, Alexandr M.; Kusainov, Temirkhan A.; Burovoi, Isaak A.; and Omarov, Bulat N., to Khimiko-metallurgicheskiy Institut AN Kazakhskoi SSR. Shaft furnace for heat treatment of materials. 4,422,174., Cl. 373-115.000.

Abramovitz, Irwin J.: *See*—
Berg, Norman J.; Abramovitz, Irwin J.; Casseday, Michael W.; and Lee, John N., 4,421,388., Cl. 350-358.000.

Acampora, Alfonse: *See*—
Lewis, Henry G., Jr.; and Acampora, Alfonse, 4,422,094., Cl. 358-37.000.

ACCRA Manufacturing Co.: *See*—
Stock, Carl R., 4,421,093., Cl. 124-86.000.

Accumulatorenwerke Hoppecke Carl Zoellner & Sohn GmbH & Co. KG: *See*—
Ruch, Jean; and Nelles, Josef, 4,421,322., Cl. 277-12.000.

Accutest Corporation: *See*—
Treakle, Paul W.; and Cielakie, Edward W., 4,421,370., Cl. 339-59.00M.

Adachi, Kinichi; Shimoda, Hisanori; Hirata, Yasushi; and Ohmukai, Yoshimi, to Matsushita Electric Industrial Co., Ltd. Combustion wick. 4,421,477., Cl. 431-325.000.

Adams, Kenneth D.: *See*—
Kornatowski, Boleslaw; and Adams, Kenneth D., 4,421,043., Cl. 112-260.000.

Adcock, Thomas P. Concentrating/tracking solar energy collector. 4,421,104., Cl. 126-438.000.

Adema, Carl M.; and Schatzberg, Paul, to United States of America, Navy. Situ incineration/detoxification system for antifouling coatings. 4,421,048., Cl. 114-222.000.

Advanced Coating Technology, Inc.: *See*—
Hollars, Dennis R., 4,421,622., Cl. 204-192.00P.

Advanced Graphic Technology: *See*—
Arnold, Raymond M., 4,421,816., Cl. 428-202.000.

Advanced Micro Devices, Inc.: *See*—
Chuang, Patrick T.; and Keswick, Paul D., 4,421,996., Cl. 307-530.000.

AEPLC: *See*—
Davies, Glyndwr J., 4,421,588., Cl. 156-308.200.

AEW Engineering Co. Limited: *See*—
Whitehouse, John A., 4,420,997., Cl. 83-105.000.

AGA Aktiebolag: *See*—
Lofstrom, Per, 4,421,273., Cl. 239-8.000.

Agarwal, Pawan K.: *See*—
Lundberg, Robert D.; Thaler, Warren A.; and Agarwal, Pawan K., 4,421,882., Cl. 524-31.000.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See*—
Bianchin, Christian; Deneuville, Alain F.; and Gerard, Philippe, 4,421,677., Cl. 252-501.100.

Agency of Industrial Science & Technology: *See*—
Osumi, Yasuaki; Suzuki, Hiroshi; Kato, Akihiko; and Oguro, Keisuke, 4,421,718., Cl. 420-443.000.

Agfa-Gevaert Aktiengesellschaft: *See*—
Jung, Heinrich; and Biskup, Ulrich, 4,421,847., Cl. 430-621.000.
Steube, Fritz, 4,421,399., Cl. 354-299.000.

Agrigenetics Corporation: *See*—
Jones, James L.; Keyser, E. Glen; and Phillips, James C., 4,421,544., Cl. 71-7.000.

Aguzzi, Giovanni: *See*—
Sacchetti, Massimo; Aguzzi, Giovanni; Bianchi, Gianvittorio; and Caroprese, Giuseppe, 4,421,532., Cl. 55-28.000.

Ahlbeck, Stig G. Urine drainage device permitting training of the bladder. 4,421,510., Cl. 604-323.000.

Ahner, Peter; Harer, Helmut; and Schustek, Siegfried, to Robert Bosch GmbH. Compact alternator for a self-contained on-board electric network, particularly for an automotive vehicle. 4,421,998., Cl. 310-68.00R.

Aiba, Yasuaki, to Honda Giken Kogyo Kabushiki Kaisha. Device for preventing displacement of an engine in a motorcycle. 4,421,195., Cl. 180-228.000.

Air Industrie: *See*—
Buffet, Jean, 4,420,940., Cl. 62-3.000.

Air Products and Chemicals, Inc.: *See*—
Dalton, Augustine I., Jr.; Sheridan, John J., III; and Zagnoli, David A., 4,421,530., Cl. 55-26.000.
Dalton, Augustine I., Jr.; Sheridan, John J., III; and Zagnoli, David A., 4,421,531., Cl. 55-26.000.

Aizawa, Shirou: *See*—
Murakami, Tadashi; Suzuka, Teruo; Inoue, Yukio; and Aizawa, Shirou, 4,421,635., Cl. 208-112.000.

Akagiri, Kenzo; and Katakura, Masayuki, to Sony Corporation. Gain control circuit. 4,422,049., Cl. 330-134.000.

Akagiri, Kenzo: *See*—
Katakura, Masayuki; and Akagiri, Kenzo, 4,422,051., Cl. 330-278.000.

Akami, Kenji: *See*—
Miura, Masayoshi; Oda, Gen; Akami, Kenji; and Naito, Hiroshi, 4,422,086., Cl. 346-140.00R.

Akimoto, Hidetoshi: *See*—
Komuro, Takeo; Gomi, Kenichi; Arashi, Norio; Akimoto, Hidetoshi; Hishinuma, Yukio; Iinuma, Hajime; and Kanda, Osamu, 4,421,732., Cl. 423-569.000.

Akkerman, Neil H.: *See*—
McStravick, David M.; and Akkerman, Neil H., 4,421,174., Cl. 166-374.000.

Aktiebolaget Bofors: *See*—
Hallstrom, Stig; and Horman, Lars, 4,421,004., Cl. 86-20.00D.

Akutagawa Chocolate Co., Ltd.: *See*—
Akutagawa, Tokuji, 4,421,773., Cl. 426-249.000.

Akutagawa, Tokuji, to Akutagawa Chocolate Co., Ltd. Process for molding chocolate to make chocolate block having ornamental pattern and internal hollow cavity. 4,421,773., Cl. 426-249.000.

Akzona Incorporated: *See*—
ter Burg, Antonius W. M.; and den Hoedt, Gerrit, 4,421,439., Cl. 405-258.000.

Albanese, Andres, to Bell Telephone Laboratories, Incorporated. Electrical-optical interface network. 4,422,179., Cl. 455-601.000.

Alberti, Adriano, to Rockwell International Corporation. Upper feed dog device. 4,421,047., Cl. 112-311.000.

Aldred, Fred C.; and Moseley, Charles R., to Courtaulds Limited. Man-made filaments and method of making wound dressings containing them. 4,421,583., Cl. 156-167.000.

Alfa Romeo S.p.A.: *See*—
Garcea, Giampaolo; Banfi, Ambrogio; and Di Stefano, Michele L., 4,421,074., Cl. 123-90.150.

Allan, John; and Musgrove, Peter J., to Sir Robert McAlpine & Sons (Trade Investments) Limited. Wind powered turbine. 4,421,458., Cl. 416-117.000.

Allen, Danny H.; and Sumner, John H., to Burlington Industries, Inc. Dobby-activated loom motion lock-nut device. 4,421,140., Cl. 139-1.00E.

Allen, Edwin; Dillarstone, Alan; and Reul, Joseph A., to Colgate-Palmolive Company. Heavy duty laundry softening detergent composition and method for manufacture thereof. 4,421,657., Cl. 252-8.600.

Allied Corporation: *See*—
Schultz, Ronald W.; and Graham, Donald R., 4,421,246., Cl. 220-307.000.

Allied Corporation, Law Department: *See*—
Wortley, David L.; and Larson, Kenneth N., 4,422,171., Cl. 371-32.000.

Allmer, Franz, to Canron Corporation. Compact bidirectionally operative tie exchanging apparatus. 4,421,034., Cl. 104-9.000.

Allo, Vincent F.: *See*—
Stafford, Donald C.; and Allo, Vincent F., 4,421,160., Cl. 165-76.000.

Alloue, Raymond; and Mergey, Claude, to Carnaud S.A. Steel sheet carrying a protective layer and process for producing such a sheet. 4,421,828., Cl. 428-629.000.

Almslatt, Ingemar H. G.: *See*—
Parlenvi, Paul; and Almslatt, Ingemar H. G., 4,421,488., Cl. 434-185.000.

Alsthom-Atlantique: *See*—
Foucher, Gerard; and Hermand, Michel, 4,421,425., Cl. 384-123.000.
Organi, Henri, 4,420,970., Cl. 73-46.000.
Thuries, Edmond; Sigward, Pierre-Paul; Besson, Marcel; Van, Doan P.; and Nicoloso, Dante, 4,421,962., Cl. 200-144.0AP.

Alten, Kurt. Ramp bridging device. 4,420,849., Cl. 14-71.300.

Alvarez, Jose A. A., to T & R Chemicals, Inc. Antihypertension treatment. 4,421,743., Cl. 424-162.000.

Alvino, William M., to Westinghouse Electric Corp. Flame-resistant aqueous epoxy impregnating compositions containing nonionic surface active agents. 4,421,877., Cl. 523-414.000.

Amano, Kyosuke, to Asahi Kagaku Kogyo Kabushiki Kaisha. Bright wide-angle lens for compact color video cameras. 4,421,390., Cl. 350-459.000.

Amano, Toshiaki. X-Y Plotter for producing diagrams from computer information. 4,420,886., Cl. 33-1.00M.

AMCA International: *See*—
Long, Gene M.; DeWitt, Terry E.; and Bell, John R., III, 4,420,913., Cl. 52-57.000.

American Cyanamid Company: *See*—
Kourtz, Raymond E.; and Daftary, Shashikumar H., 4,421,707., Cl. 264-182.000.
Tomcufcik, Andrew S.; Meyer, Walter E.; and Dusza, John P., 4,421,753., Cl. 424-250.000.

American Hoechst Corporation: *See*—
Neumann, Don B.; Norton, Lyle K.; and Olson, Eric V., 4,422,083., Cl. 346-108.000.

American Microsystems, Inc.: *See*—
Amir, Gideon; Gregorian, Roubik; and Dujari, Ghanshyam, 4,422,155., Cl. 364-606.000.

American Science and Engineering, Inc.: *See*—
Mastronardi, Richard; DeCew, Alan; and McMahon, David, 4,422,177., Cl. 378-17.000.

American Standard, Inc.: *See*—
Parkison, Richard G.; and Hofstetter, Edward G., 4,421,294., Cl. 251-86.000.
Parkison, Richard G., 4,421,295., Cl. 251-86.000.

Amhil Enterprises Ltd.: *See*—
Van Melle, Hubert, 4,421,244., Cl. 220-306.000.

Amir, Gideon; Gregorian, Roubik; and Dujari, Ghanshyam, to American Microsystems, Inc. Multiplier/adder circuit. 4,422,155., Cl. 364-606.000.

AMP Incorporated: *See*—
Coldren, Daniel R., 4,421,375., Cl. 339-97.00R.
Cosmos, Pete; and McCleerey, Earl W., 4,421,376., Cl. 339-103.00M.
Ritchie, Leon T.; Snyder, Clair W., Jr.; Toeppen, Thurston H.; and Woratyla, John A., 4,420,882., Cl. 29-837.000.

Ampaya, Jaime P.; Heredy, Laszlo A.; and Kohl, Arthur L., to Rockwell International Corporation. Hydrocarbon treatment process. 4,421,631., Cl. 208-8.00R.

Anatros Corporation: *See*—
Danby, Hal C.; and Ritson, Carl, 4,421,506., Cl. 604-34.000.

Anderson, Charles R.; and Oakes, Thomas R., to Economics Laboratory, Inc. Compatible enzyme and oxidant bleaches containing cleaning composition. 4,421,664., Cl. 252-94.000.

Anderson, John C.: *See*—
Sun, Lilla S.; and Anderson, John C., 4,421,857., Cl. 436-2.000.

Anderson, William S., to United Technologies Corporation. Method of generating combustion gases utilizing polynorborene-based combustible compositions. 4,420,931., Cl. 60-219.000.

Andersson, Roland; Hoglund, Per-Erik; and Glimskar, Bo, to Byggergonomilaboratoriet HB. Vibration-damping arrangement. 4,421,181., Cl. 173-162.00H.

Ando, Atsuo: *See*—
Yoshitsugu, Noritada; and Ando, Atsuo, 4,421,343., Cl. 280-752.000.

Ando, Toshinari: *See*—
Furuto, Yoshio; Meguro, Shinichiro; Suzuki, Takuya; Ito, Ikuo; Ando, Toshinari; Nishi, Masataka; and Shimamoto, Susumu, 4,421,946., Cl. 174-128.00S.

Andrew, Sydney P. S., to Imperial Chemical Industries PLC. Cooling towers. 4,421,303., Cl. 261-109.000.

Andrews, Robert B., Jr.: *See*—
Keller, Bruce E.; Andrews, Robert B., Jr.; Wylie, Charles F.; and Brinkerhoff, Kenneth W., 4,422,150., Cl. 364-475.000.

Anglo Mineral Resources, Inc.: *See*—
Hunnel, Larry B., 4,421,724., Cl. 423-22.000.

Ankeny, Donald: *See*—
Lehnert, Stanley E.; and Ankeny, Donald, 4,422,020., Cl. 315-371.000.

Antonazzi, Frank J.; and Ohnesorge, David H., to Bendix Corporation, The. Pressure transducer with an invariable reference capacitor. 4,422,125., Cl. 361-283.000.

Antunez, Bruce A. Float valve assembly with flow control and volume balancing means. 4,420,845., Cl. 4-366.000.

Aoki, Hiroyuki: *See*—
Ikezawa, Kenji; Takao, Hiroshi; Aoki, Hiroyuki; and Kimura, Shinji, 4,421,787., Cl. 427-126.200.

Aoshima, Terutaka: *See*—
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Apparatebau Rothemuhle Brandt & Kritzler GmbH: *See*—
Sandmann, Herbert, 4,421,157., Cl. 165-4.000.

Appels, Johannes A.: *See*—
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Appor Limited: *See*—
Williamson, Audley B.; Banks, Stewart; and Rice, Francis J., 4,421,249., Cl. 222-88.000.

Arai, Sakuji: *See*—
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Arai, Yoshio; Kataoka, Hiroyuki; and Endo, Nobuaki, to Fuji Xerox Co., Ltd. Oblique projection original and oblique projection original forming apparatus and method. 4,422,153., Cl. 364-525.000.

Araki, Toshio; and Fujikawa, Kenji, to Canon Kabushiki Kaisha. Electrical resistance regulator. 4,422,064., Cl. 338-162.000.

Aral, Gurcan, to Measurex Corporation. Optimization of steam distribution. 4,421,068., Cl. 122-448.00B.

Aramaki, Yoshimitsu; and Harao, Norio, to Tokyo Shibaura Denki Kabushiki Kaisha. Electron tube having a photoelectric screen. 4,422,008., Cl. 313-524.000.

Arashi, Norio: *See*—
Komuro, Takeo; Gomi, Kenichi; Arashi, Norio; Akimoto, Hidetoshi; Hishinuma, Yukio; Iinuma, Hajime; and Kanda, Osamu, 4,421,732., Cl. 423-569.000.

Arbed S.A.: *See*—
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Arbir, Francis W.; Raden, Daniel S.; Narducy, Kenneth W.; and Casati, Francois M., to Abbott Laboratories. Catalyst for making polyurethanes. 4,421,673., Cl. 502-167.000.

Arbir, Francis W.; Raden, Daniel S.; and Narducy, Kenneth W., to Abbott Laboratories. Catalyst for making polyurethanes. 4,421,869., Cl. 521-126.000.

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Argela', Gianluigi: *See*—
Buzio, Pierpaolo; Edefonti, Lucio; and Argela', Gianluigi, 4,421,780., Cl. 427-40.000.

Arikawa, Tetsuro; and Yamada, Hideyuki, to Nippon Air Brake Co., Ltd. Brake fluid pressure control apparatus in skid control system. 4,421,361., Cl. 303-92.000.

Arima, Sumitsugu; Tsuda, Hiroshi; and Fukunaga, Yukio, to Nissan Motor Company, Limited. Steering wheel with switch assembly. 4,421,960., Cl. 200-61.540.

Armco Inc.: *See*—
Dahlke, Milton F., 4,422,173., Cl. 373-94.000.
Galle, Edward M., Jr., 4,421,164., Cl. 166-118.000.

Armini, Anthony J.; and Nowlan, Michael J., to Spire Corporation. Laminator for encapsulating multilayer laminate assembly. 4,421,589., Cl. 156-382.000.

Armstrong, A. Douglas; Bodenheimer, Vernon B.; and Rytter, Tom O., to Georgia-Pacific Corporation. Method for recovering heat in an alkaline pulp digesting process. 4,421,597., Cl. 162-47.000.

Armstrong World Industries, Inc.: *See*—
Bolgiano, Nicholas C.; and Sigman, William T., 4,421,782., Cl. 427-53.100.

Arneson, Leonard A.: *See*—
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Arnold, Raymond M., to Advanced Graphic Technology. Dry transfer decal and method of manufacture. 4,421,816., Cl. 428-202.000.

Arnoldi, Wilhelm: *See*—
Reinmold, Heinz-Josef; Mucha, Horst; and Arnoldi, Wilhelm, 4,422,149., Cl. 364-473.000.

Arnoux, Daniel; Leconte, Andre; Genter, Claude; and Michel, Bernard, to Societe en Commandite par actions dite: Chauvin Arnoux. Stake notably for measuring the electrical resistances of ground connections. 4,420,918., Cl. 52-157.000.

Arregui, Manuel; Diaz, Rafael; Gamon, Vicente; and Yarza, Javier. Rotating cylinder internal combustion engine. 4,421,073., Cl. 123-43.00R.

Arter, Nelson K.; Bartholet, Michael A.; Emeigh, Roger D.; and Herman, Marion J., to International Business Machines Corporation. Variable thickness set compensation for stapler. 4,421,264., Cl. 227-2.000.

Arthur, Hugh M.; and Labbe, Francis A. M., to Molins Limited. Apparatus for treating filter material. 4,421,055., Cl. 118-620.000.

ASA S.A.: *See*—
Remontet, Jean, 4,420,926., Cl. 57-100.000.

Asahi-Dow Limited: *See*—
Kasahara, Hideo; Tazaki, Kichiya; Fukuda, Kunio; and Suzuki, Hiroshi, 4,421,892., Cl. 524-514.000.

Asahi Kagaku Kogyo Kabushiki Kaisha: *See*—
Amano, Kyosuke, 4,421,390., Cl. 350-459.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Doi, Yuzuru; Kakeda, Teruyuki; and Kawamura, Noriaki, 4,421,382., Cl. 350-96.200.

Asai, Nobuyoshi: *See*—
Goto, Takeshi; Soeda, Takashi; Asai, Nobuyoshi; and Tanaka, Akira, 4,421,693., Cl. 260-464.000.

Asami, Ken: *See*—
Ito, Keiichi; Yamaguchi, Nobuyuki; Hayashi, Kazuhiko; Asami, Ken; Sato, Kazuo; and Ochiai, Takeshi, 4,421,192., Cl. 180-179.000.

Asano, Mitsuru: *See*—
Inoguchi, Kazuhiro; Nakanishi, Tomohiko; and Asano, Mitsuru, 4,421,699., Cl. 264-56.000.

Asano, Takamasa: *See*—
Horie, Shigeru; Asano, Takamasa; Ichihashi, Tetsuo; and Katoh, Hideo, 4,421,887., Cl. 524-317.000.

Aaswa, Charles K.; and Yao, Shi-Kay, to TRW Inc. Microbending of optical fibers for remote force measurement. 4,421,979., Cl. 250-227.000.

ASCO Di Vandelli Dino & C. S.N.C.: *See*—
Vandelli, Dino; Fabriani, Ugo; and Vandelli, Ambrogino, 4,421,178., Cl. 172-548.000.

Ashby, Bruce A., to General Electric Company. Platinum complex catalysts. 4,421,903., Cl. 528-15.000.

Asher, Jeffrey A.: *See*—
Briant, Jacqueline L.; and Asher, Jeffrey A., 4,422,129., Cl. 361-433.000.

Atari, Inc.: *See*—
Hector, Roger D.; and Jenkins, Harry H., Jr., 4,421,317., Cl. 273-313.000.

Athey, Graham, to Imperial Chemical Industries Limited. Coverstock fabrics. 4,421,813., Cl. 428-195.000.

Atlantic Richfield Company: *See*—
Baillie, Lloyd A.; and Uhl, George A., 4,420,966., Cl. 73-28.000.
Dearth, James D.; and Wolcott, Herbert B., Jr., 4,421,169., Cl. 166-285.000.
Matthews, J. David, 4,421,520., Cl. 44-6.000.

Aubert, Jean-Paul, to Coflexip. Flexible tubular conduit for transferring fluids particularly at high temperature and/or pressure and piping comprising such a conduit. 4,421,136., Cl. 137-340.000.

Auto-Cast International, Ltd.: *See*—
Heitzman, Charles J., 4,421,466., Cl. 425-125.000.

Automobiles Peugeot: *See*—
Chandioux, Andre, 4,421,197., Cl. 180-258.000.

Auvil, Raymond G., Jr. Cleaning apparatus. 4,421,131., Cl. 134-104.000.

Axelson, Inc.: *See*—
Bruton, Billy R.; and Snyder, David E., 4,421,134., Cl. 137-72.000.

Ayers, Ray R., to Shell Oil Company. Flexible pipeline joints. 4,421,345., Cl. 285-223.000.

B.S.H. Electronics (Manchester) Limited: *See*—
Kropielnicki, Jerzy J., 4,422,077., Cl. 343-704.000.

B S L (Bignier Schmid-Laurent): *See*—
Taquoi, Jean-Pierre, 4,421,243., Cl. 220-1.500.

Babcock, Ronald D.: *See*—
Bartholmey, Don S.; Babcock, Ronald D.; and Weisel, George L., 4,420,949., Cl. 62-354.000.

Babcock & Wilcox Company, The: *See*—
Dronkers, Peter, 4,421,714., Cl. 376-204.000.
Golden, Raymond, 4,421,372., Cl. 339-75.0MP.

Babuder, Gerald A.: *See*—
Koch, Ulrich H.; and Babuder, Gerald A., 4,421,293., Cl. 251-61.400.

Back, Harry E.: *See*—
Fogle, Ozzie; and Back, Harry E., 4,421,983., Cl. 250-339.000.

Bailey, Alan S. Automatic lighting disconnect timer incorporating an acoustic abort switch. 4,422,018., Cl. 315-360.000.

Baillie, Lloyd A.; and Uhl, George A., to Atlantic Richfield Company. Method for determining solids or liquids in vapor. 4,420,966., Cl. 73-28.000.

Baird, Wanda F.: *See*—
Puckett, William E.; Baird, Wanda F.; and Chappell, Richard C., 4,420,844., Cl. 4-295.000.

Baker International Corporation: *See*—
Haynes, Andrew, 4,421,171., Cl. 166-331.000.
McStravick, David M.; and Akkerman, Neil H., 4,421,174., Cl. 166-374.000.
Swift, Edward R., Jr.; and Schmuck, Philip W., 4,421,170., Cl. 166-312.000.

Baker, John E.; Topor, Michael G.; Ivers, John T.; and Stutz, H. Kent, to Frito-Lay, Inc. Process for treating confectionery. 4,421,779., Cl. 426-660.000.

Baker, Samuel M., to JWI Ltd. Wear resistant paper machine fabric. 4,421,819., Cl. 428-229.000.

Baldwin, Dorothy M.; Oharek, Frank J.; and Spooner, Archer M., to United States of America, Navy. Field of view test apparatus. 4,421,486., Cl. 434-44.000.

Ball, David N.: *See*—
Farquhar, Robert L.; and Ball, David N., 4,421,984., Cl. 250-339.000.

Balzers Aktiengesellschaft: *See*—
Quaderer, Hans, 4,421,628., Cl. 204-298.000.

Banfi, Ambrogio: *See*—
Garcea, Giampaolo; Banfi, Ambrogio; and Di Stefano, Michele L., 4,421,074., Cl. 123-90.150.

Banks, Stewart: *See*—
Williamson, Audley B.; Banks, Stewart; and Rice, Francis J., 4,421,249., Cl. 222-88.000.

Bannai, Kiyoshi: *See*—
Okamura, Noriaki; Toru, Takeshi; Oba, Takeo; Tanaka, Toshio; Bannai, Kiyoshi; Watanabe, Kenzo; Kurozumi, Seizi; Naruchi, Tatsuyuki; and Komoriya, Keiji, 4,421,914., Cl. 544-278.000.

Barber, James C., to James C. Barber and Associates, Inc. Process for agglomerating carbon particles. 4,421,521., Cl. 44-16.00R.

Bargman, Ronald. Process, disposable roller cover, and masking preform for removing adhesive tape. 4,421,586., Cl. 156-247.000.

Barnes, Derek; Churchland, Mark T.; Herndier, Arnold W.; and Welsh, James K., to MacMillan Bloedel Limited. Process for preparation of long wood strands. 4,421,149., Cl. 144-366.000.

Barnes Drill Co.: *See*—
Estabrook, Mark R.; and Marchman, James I., 4,421,647., Cl. 210-387.000.

Barnes, Jesse H.: *See*—
Thurston, Kent W.; and Barnes, Jesse H., 4,421,328., Cl. 277-216.000.

Barnes, Michael F., to Motorola, Inc. Multi-frequency busy signal synthesizing circuitry. 4,421,952., Cl. 179-2.0EA.

Barnett, Larry R. Barnetron microwave amplifiers and oscillators. 4,422,045., Cl. 330-4.000.

Barreau, Alain: *See*—
Rojcy, Alexandre; Larue, Joseph; and Barreau, Alain, 4,420,946., Cl. 62-101.000.

Barrios, Raphael A.: *See*—
Hoffman, Fred W.; and Barrios, Raphael A., 4,421,211., Cl. 188-79.50K.

Bartholet, Michael A.: *See*—
Arter, Nelson K.; Bartholet, Michael A.; Emeigh, Roger D.; and Herman, Marion J., 4,421,264., Cl. 227-2.000.

Bartholmey, Don S.; Babcock, Ronald D.; and Weisel, George L., to North star Ice Equipment Corporation. Seawater ice making apparatus. 4,420,949., Cl. 62-354.000.

Bartsch, Richard A., to PCR Research Chemicals, Inc. Ring substituted crown ethers and method of producing same. 4,421,923., Cl. 549-349.000.

Baschang, Gerhard: *See*—
Sallmann, Alfred; and Baschang, Gerhard, 4,421,765., Cl. 424-309.000.

BASF Aktiengesellschaft: *See*—
Brunnmueller, Fritz; Schneider, Rolf; Kroener, Michael; Mueller, Hans; and Linhart, Friedrich, 4,421,602., Cl. 162-168.200.
Buthe, Ingolf; Strachle, Wolfgang; Marx, Matthias; and Peters, Reinhard, 4,421,872., Cl. 521-174.000.
Echte, Adolf; Gausepohl, Hermann; and Gerberding, Karl, 4,421,895., Cl. 525-53.000.
Kreitner, Ludwig; Klapper, Juergen; and Schober, Horst, 4,421,642., Cl. 209-384.000.
Lehner, August; Werther, Heinz U.; Naegele, Dieter; Lenz, Werner; Jun, Mong-Jon; Reimann, Horst; and Eckell, Albrecht, 4,421,840., Cl. 430-273.000.
McKee, Graham E.; Brandstetter, Franz; Echte, Adolf; Hambrecht, Juergen; Overhoff, Heinz-Juergen; Priebe, Edmund; Schwaab, Josef; and Siebel, Peter, 4,421,875., Cl. 523-335.000.
Stutz, Herbert; Illers, Karl H.; Haberkorn, Herbert; and Heckmann, Walter, 4,421,870., Cl. 521-160.000.
Tonne, Peter; Ludwig, Winfried; Kilpper, Gerhard; and Grimmer, Johannes, 4,421,931., Cl. 564-139.000.

BASF Wyandotte Corporation: *See*—
Korczak, Alexander; and Levis, William W., Jr., 4,421,871., Cl. 521-167.000.

Bassett, William W.; and Rask, Dean R., to Honeywell Inc. Integrated control system using a microprocessor. 4,421,268., Cl. 236-10.000.

Bates, John F.; Brager, Howard R.; and Paston, Michael M., to United States of America, Energy. Thermomechanical treatment of alloys. 4,421,572., Cl. 148-12.00E.

Batton, Carol B.: *See*—
Kekish, George T.; and Batton, Carol B., 4,421,791., Cl. 427-239.000.

Baudouin, Michel; and Linares, Hubert, to Rhone-Poulenc Sante. Process for the preparation of 7-chloro-1,2,3,4-tetrahydroquinolin-4-one. 4,421,918., Cl. 546-153.000.

Baudouin, Michel; and Michelet, Daniel, to Rhone-Poulenc Sante. Process for the preparation of 4-amino-chloroquinolines. 4,421,920., Cl. 546-163.000.

Bauer, Fritz. Movie camera sprocket drive mechanism. 4,421,395., Cl. 352-159.000.

Bauer, Helmut: *See*—
Krob, Erwin; and Bauer, Helmut, 4,421,341., Cl. 280-628.000.

Bauer, Ivan K.: *See*—
Abishev, Dzhantore N.; Malyshev, Vitaly P.; Bauer, Ivan K.; Yarygin, Vladimir A.; Maisakov, Mikhail E.; Gainutdinov, Garifulla K.; Nazarov, Alexandr M.; Kusainov, Temirkhan A.; Burovoi, Isaak A.; and Omarov, Bulat N., 4,422,174., Cl. 373-115.000.

Bauman, Robert A., to Colgate-Palmolive Company. Antistatic laundry treatment. 4,421,514., Cl. 8-137.000.

Baumann, Peter; and Biedermann, Lutz. Ski boot. 4,420,895., Cl. 36-118.000.

Baumbach, Bertram W., to Reliance Electric Company. Line protector for a communications circuit. 4,422,121., Cl. 361-119.000.

Bausch, Joachim: *See*—
Federmann, Helmut; and Bausch, Joachim, 4,421,497., Cl. 464-181.000.

Bayer Aktiengesellschaft: *See*—
Braun, Burkhard; Vosteen, Bernhard; Skerhut, Reiner; and Sinn, Adolf, 4,420,892., Cl. 34-183.000.
Eimers, Erich; Kraft, Klaus; and Margotte, Dieter, 4,421,879., Cl. 523-500.000.
Kruger, Bruno; Winkler, Adolf; and Hentze, Gunter, 4,421,694., Cl. 260-465.00E.
Lindner, Christian; and Ott, Karl-Heinz, 4,421,901., Cl. 525-309.000.
Reichardt, Manfred; Pieper, Christian; Nogaj, Alfred; Sandhu, Surinder S.; and Gartner, Eckhard, 4,421,708., Cl. 264-206.000.

Stephan, Gunter; and Schundehutte, Karl H., 4,421,601., Cl. 162-162.000.
Bayerische Motoren Werke: *See*—
Kosak, Werner; and Matschinsky, Wolfgang, 4,421,332., Cl. 280-95.00R.
BBC Brown, Boveri & Company, Limited: *See*—
Schluchter, Martin; and Schroder, Paul, 4,421,291., Cl. 248-635.000.
Beakley, Bruce E.; and Nayler, Douglas W. J., to NL Industries, Inc. Motion compensator with improved position indicator. 4,421,173., Cl. 166-336.000.
Beavers, John A.; and Witten, Raymond L., to Hughes Tool Company. Submersible pump seal section with multiple bellows. 4,421,999., Cl. 310-87.000.
Becker, Philip D., to Buell Industries, Inc. Method and apparatus for manufacturing welded capped wheel nuts. 4,420,848., Cl. 10-72.00R.
Beckman Instruments, Inc.: *See*—
Sun, Lilla S.; and Anderson, John C., 4,421,857., Cl. 436-2.000.
Becton Dickinson and Company: *See*—
Percarpio, Edward P., 4,421,123., Cl. 128-766.000.
Beddow, David V.: *See*—
Schneider, Barry L.; and Beddow, David V., 4,421,509., Cl. 604-317.000.
Beecham Group Limited: *See*—
Box, Stephen J., 4,421,760., Cl. 424-274.000.
Belcourt, Francis J.; and van Dyke, Martin J., to Honeywell Inc. Condition sensor interface means. 4,422,066., Cl. 340-500.000.
Bell & Howell Company: *See*—
Guenther, Kenneth L.; Zemke, Edward H.; and Warden, Gerald D., 4,421,587., Cl. 156-256.000.
Starai, Rudolph, 4,422,026., Cl. 318-640.000.
Bell, John R., III: *See*—
Long, Gene M.; DeWitt, Terry E.; and Bell, John R., III, 4,420,913., Cl. 52-57.000.
Bell Telephone Laboratories, Incorporated: *See*—
Albanese, Andres, 4,422,179., Cl. 455-601.000.
Craighead, Harold G.; and Howard, Richard E., 4,422,159., Cl. 365-127.000.
Shoji, Masakazu, 4,422,141., Cl. 364-200.000.
Van Bosse, John G., 4,421,951., Cl. 179-2.0DP.
Wallace, Robert L., Jr., 4,421,957., Cl. 179-121.00D.
Bellah, Glen R.; Sobol, Lawrence M.; Idelman, Lloyd B.; and Thanh, Vo V., to International Harvester Co. Park lock interlock control system. 4,421,215., Cl. 192-4.00A.
Belogub, Alexandr V.: *See*—
Mischenko, Anatoly I.; Talda, Gennady B.; Belogub, Alexandr V.; Podgorny, Anatoly N.; Makarov, Alexandr A.; Zhemerenko, Anatoly T.; Domrachev, Anatoly I.; and Efremov, Petr K., 4,421,072., Cl. 123-1.00A.
Bendix Corporation, The: *See*—
Antonazzi, Frank J.; and Ohnesorge, David H., 4,422,125., Cl. 361-283.000.
Hoffman, Fred W.; and Barrios, Raphael A., 4,421,211., Cl. 188-79.50K.
Lewis, Donald J.; and Phipps, Jack R., 4,421,280., Cl. 239-585.000.
Moore, Robert G., Jr., 4,421,089., Cl. 123-454.000.
Ratchford, Lloyd G.; and Werth, Dee A., 4,421,373., Cl. 339-94.00M.
Sanford, Richard; and Bourdon, Normand C., 4,421,378., Cl. 339-217.00R.
Winner, Joe K., 4,422,073., Cl. 340-870.210.
Benedikter, Lothar; and Kutter, Eberhard, to Dr. Karl Thomae Gesellschaft mit beschrankter Haftung. Method of treating coronary heart disease with imidazo(4,5-B)pyridines. 4,421,755., Cl. 424-256.000.
Benezra, Leo L.: *See*—
Covitch, Michael J.; DeRespiris, Donald L.; Benezra, Leo L.; and Vauss, Elvin M., 4,421,579., Cl. 156-60.000.
Benkendorf, Sol; Calamito, Frank A.; and Zaccaria, Carmine M. Nitrocellulose lacquer composition containing gelatin and acrylic copolymers. 4,421,881., Cl. 524-24.000.
Bennett, Peter C.: *See*—
Coffee, Ronald A.; and Bennett, Peter C., 4,421,281., Cl. 239-690.000.
Benschoter, Barry R.: *See*—
McEwen, Stephen N.; Stevens, Robert L.; and Benschoter, Barry R., 4,420,868., Cl. 29-460.000.
Berg, Norman J.; Abramovitz, Irwin J.; Casseday, Michael W.; and Lee, John N., to United States of America, Army. Acousto-optic time integrating frequency scanning correlator. 4,421,388., Cl. 350-358.000.
Bergamini, John V. W. Roll-out layered expansible membranes (ROLEM). 4,421,203., Cl. 181-284.000.
Bergwerksverband GmbH: *See*—
Rogge, Karl; and Gappa, Gunther, 4,421,672., Cl. 502-55.000.
Berkovits, Barouh V.; and McDonald, Ray S. Tachycardia treatment. 4,421,114., Cl. 128-419.0PG.
Berns, Joseph F., Jr.: *See*—
Leon, Theodoor P. C.; and Berns, Joseph F., Jr., 4,421,446., Cl. 414-17.000.
Bertin, Patrice; and Ledamoisel, Claude, to Valeo Societe Anonyme. Power assisted steering device for a vehicle. 4,421,191., Cl. 180-132.000.
Besik, Ferdinand. Apparatus and a method for biological treatment of waste waters. 4,421,648., Cl. 210-605.000.
Besson, Marcel: *See*—
Thuries, Edmond; Sigward, Pierre-Paul; Besson, Marcel; Van, Doan P.; and Nicoloso, Dante, 4,421,962., Cl. 200-144.0AP.
Bethlehem Steel Corporation: *See*—
Stavros, Anthony J., 4,421,054., Cl. 118-63.000.
Beuther, Harold; and Schulz, Johan G., to Gulf Research & Development Company. Process for operating a furnace or a combustion engine. 4,420,930., Cl. 60-39.461.
Bianchi, Gianvittorio: *See*—
Sacchetti, Massimo; Aguzzi, Giovanni; Bianchi, Gianvittorio; and Caroprese, Giuseppe, 4,421,532., Cl. 55-28.000.
Bianchin, Christian; Deneuville, Alain F.; and Gerard, Philippe, to Commissariat a l'Energie Atomique; and Agence Nationale de Valorisation de la Recherche (ANVAR). Transparent material having electrical conductivity which is dependent on the dose of optical radiation received. 4,421,677., Cl. 252-501.100.
Biedermann, Lutz: *See*—
Baumann, Peter; and Biedermann, Lutz, 4,420,895., Cl. 36-118.000.
Bildjukevich, Viktor L.; Turovsky, Leonid N.; Meleshko, Vyacheslav J.; Yakimovich, Dmitry T.; Lebedkova, Valentina A.; Demidovich, Boris K.; Plavnik, Gennady Z.; Dubrovsky, Nikolai N.; Proskalovich, Evgeny A.; and Pivovarov, Alexandr I. Method of and apparatus for producing granulated products from a suspension. 4,421,594., Cl. 159-4.00R.
Biller, Bruce A.; Scherer, Henry W.; and Swanson, Roy, to S&C Electric Company. Apparatus for associating an electrical device with a mounting therefor. 4,422,062., Cl. 337-171.000.
Billerud Uddeholm Aktiebolag: *See*—
Hogberg, Ebbe T., 4,421,596., Cl. 162-30.110.
Billingsley, James D.; and Eden, Dayton D., to Vought Corporation. Dark field infrared telescope. 4,421,985., Cl. 250-353.000.
Bingham, John A. C.; and Kurzweil, Jack H., to Racal-Vadic, Inc. Constrained adaptive equalizer. 4,422,175., Cl. 375-14.000.
Binnig, Gerd; Nievergelt, Hermann; Rohrer, Heinrich; and Weibel, Edmund, to International Business Machines Corporation. Piezoelectric travelling support. 4,422,002., Cl. 310-328.000.
Biotrine Corporation: *See*—
Edwards, Rodney, Jr.; Burke, John W., Jr.; and Gazzara, Peter, 4,421,120., Cl. 128-725.000.
Birgel, Warren J.; and Hajec, Chester S., to VS Systems, Inc. Windmill driven eddy current heater. 4,421,967., Cl. 219-10.510.
Bish, Steven S.; Sagel, Paul J.; and Trinh, Toan, to Procter & Gamble Company, The. Floor mat with flock fibers adhesively bonded onto a thin polymeric film. 4,421,809., Cl. 428-90.000.
Biskup, Ulrich: *See*—
Jung, Heinrich; and Biskup, Ulrich, 4,421,847., Cl. 430-621.000.
Bissett, Fred L. Tread powered ski. 4,421,193., Cl. 180-192.000.
Bjune, Arne; Boe, Gunnar H.; and Danielssen, Tore, to Elkem a/s. Method of producing zinc from chloride solutions which contain chiefly iron, copper and zinc. 4,421,616., Cl. 204-115.000.
Black & Decker Inc.: *See*—
Rothman, Neil S., 4,421,111., Cl. 128-91.00A.
Todero, Giuseppe, 4,420,885., Cl. 30-381.000.
Blaszkowski, Henry. Suction cup. 4,421,288., Cl. 248-206.00R.
Blazy, Pierre; Houot, Robert; Joussemet, Robert; Haicour, Philippe; and Tracez, Jean, to Ceca S.A. Enrichment process by flotation of phosphate-containing ores with carbonated and/or siliceous gangues, by amphoteric collecting agents. 4,421,641., Cl. 209-166.000.
Bloomer, Milton D., to General Electric Company. Load resistance control circuitry. 4,421,993., Cl. 307-126.000.
Bluthe, Norbert; Gore, Jacques; and Malacria, Max, to Rhone-Poulenc Sante. Process for the preparation of 8-ethylenic carbonyl compounds. 4,421,934., Cl. 568-341.000.
Blytas, George C., to Shell Oil Company. Method of removing hydrogen sulfide from gases utilizing a stabilized metal chelate solution. 4,421,733., Cl. 423-573.00R.
Bock, Anne B., to Western Electric Company, Inc. Handling bodies containing bonding material. 4,421,266., Cl. 228-180.00A.
Bodas, Janos; Papp, Istvan; Palfalvi, Gyorgy; and Vadas, Zoltan, to Energiagazdalkodasi Intezet. Plant for utilization of low-potential waste heat of a gas-pipeline compressor station. 4,420,950., Cl. 62-402.000.
Boden, Richard M., to International Flavors & Fragrances Inc. Smoking tobacco composition or smoking tobacco article containing 1-ethoxy-1-ethanol acetate and acetaldehyde. 4,421,125., Cl. 131-276.000.
Boden, Richard M.; Dekker, Lambert; Schmitt, Frederick L.; and Van Loveren, Augustinus G., to International Flavors & Fragrances Inc. Methyl substituted-2-oxohexane derivatives and processes for preparing and using same. 4,421,679., Cl. 252-522.00R.
Bodenheimer, Vernon B.: *See*—
Armstrong, A. Douglas; Bodenheimer, Vernon B.; and Rytter, Tom O., 4,421,597., Cl. 162-47.000.
Boe, Gunnar H.: *See*—
Bjune, Arne; Boe, Gunnar H.; and Danielssen, Tore, 4,421,616., Cl. 204-115.000.
Boeing Company, The: *See*—
DeKoker, Jon G., 4,421,030., Cl. 102-218.000.
Dickey, Fred M.; and Postlethwaite, Darrell M., 4,421,409., Cl. 356-354.000.
Greiert, Alfred H., Jr., 4,421,349., Cl. 292-19.000.
Hanke, Charles R., 4,422,147., Cl. 364-440.000.
Keller, Bruce E.; Andrews, Robert B., Jr.; Wylie, Charles F.; and Brinkerhoff, Kenneth W., 4,422,150., Cl. 364-475.000.
McDermott, Arthur W., 4,420,876., Cl. 29-611.000.

Nelsen, Murray D.; Kunze, Robert K., Jr.; Olsen, Robert F.; and Rushwald, Ira B., 4,421,201., Cl. 181-214.000.
Wilkinson, Calvin L.; and Shaw, Christopher G., 4,421,105., Cl. 126-452.000.

Boettger, Ute: *See*—
Deutscher, Hans-Joachim; Richter, Sabine; Zaschke, Horst; Demus, Dietrich; and Boettger, Ute, 4,421,670., Cl. 252-299.620.

Bohannon, Robert C. Hydrogen azide-oxygen fuel cell. 4,421,829., Cl. 429-15.000.

Bohme, Georg; Kohler, Wolfgang; and Salaske, Manfred, to Kernforschungszentrum Karlsruhe G.m.b.H. Operating arm for a manipulator with length adjustment by telescoping means. 4,421,445., Cl. 414-4.000.

Bohme, Rolf: *See*—
Minner, Willy; Bohme, Rolf; Siegle, Martin; and Rinderle, Heinz, 4,422,033., Cl. 323-314.000.

Boisvenue, Rudolph J., to Eli Lilly and Company. Methods for controlling fire ants. 4,421,759., Cl. 424-273.00R.

Bokelmann, Horst, to Metzeler Schaum GmbH. Foam molding machine. 4,421,468., Cl. 425-143.000.

Bokros, Jack C., to Carbomedics, Inc. Plug-type fluid access devices. 4,421,507., Cl. 604-52.000.

Bolgiano, Nicholas C.; and Sigman, William T., to Armstrong World Industries, Inc. Process for providing improved radiation-curable surface coverings and products produced thereby. 4,421,782., Cl. 427-53.100.

Bond, Curtis J.; and Ulm, John G., to Liqui-Box Corporation. Quick-disconnect service-line connector and valve assembly. 4,421,146., Cl. 141-349.000.

Bonerb, Timothy C.; and Bonerb, Vincent C. Bin for free flowing material. 4,421,250., Cl. 222-95.000.

Bonerb, Vincent C.: *See*—
Bonerb, Timothy C.; and Bonerb, Vincent C., 4,421,250., Cl. 222-95.000.

Bonk, Leroy V.: *See*—
Abarotin, Eugene V.; and Bonk, Leroy V., 4,421,256., Cl. 222-600.000.

Bonnebat, Claude; and Macabrey, Louis, to Rhone-Poulenc Industries. Molding of elongate, hollow, biaxially oriented thermoplastic shaped articles. 4,421,711., Cl. 264-529.000.

Bonner, Jack D. Spa system. 4,420,846., Cl. 4-542.000.

Bookwalter, John R.: *See*—
Cabrera, Rene J.; Guay, George W.; and Bookwalter, John R., 4,421,108., Cl. 128-20.000.

Borcoman, Mircea. Method, devices, mold bearing structures and installations for improving the efficiency of processes for the manufacture of prestressed concrete products. 4,421,710., Cl. 264-228.000.

Bore, Pierre; and de Labbey, Arnaud, to L'Oreal. Assessment of the state of change of keratin fibers. 4,421,859., Cl. 436-86.000.

Bosshard, Ernst: *See*—
Fischer, Werner K.; and Bosshard, Ernst, 4,421,625., Cl. 204-243.00R.

Bouchard, Andre C.; and Craig, Robert F., to GTE Products Corporation. Method of making photoflash lamp. 4,421,493., Cl. 445-28.000.

Bouillon, Claude; and Vayssie, Charles, to L'Oreal. Benzylidene-camphors, processes for their preparation and cosmetic compositions containing them. 4,421,739., Cl. 424-47.000.

Boulier, Camille, to Chaussures Labelle. Method for preparing covering sheets or strips in crepe rubber, for use in the production of shoes. 4,421,585., Cl. 156-209.000.

Boulogne, Jean; Hochmann, Tibaud; Michelet, Jacques; and Morane, Bruno, to L'Oreal. Compacted greaseless cosmetic stick and particularly stick of eye shadow. 4,421,128., Cl. 132-88.500.

Bourdon, Normand C.: *See*—
Sanford, Richard; and Bourdon, Normand C., 4,421,378., Cl. 339-217.00R.

Bourget, Jean-Claude, to Les Cables de Lyon. Method of manufacturing a preform for mineral-insulated electric cable. 4,420,881., Cl. 29-825.000.

Bourlet, Maurice V.; and Storder, Jean-Pierre H., to Fabrique Nationale Herstal. Automatic pistol with combined magazine control safety and magazine ejection mechanism. 4,420,899., Cl. 42-70.00A.

Bowden, Edgar A.; Deline, Gordon R.; and Koeijmans, Gerard D., to Mobil Oil Corporation. On-bottom seismometer electronic system. 4,422,164., Cl. 367-15.000.

Bowlsby, David. Drain cleaning machines. 4,420,852., Cl. 15-104.3SN.

Box, Stephen J., to Beecham Group Limited. β-Lactam antibiotic, its preparation and use. 4,421,760., Cl. 424-274.000.

Boyadjieff, George I.; and Campbell, Andrew B., to Varco International, Inc. Method of drilling and casing a well. 4,421,175., Cl. 166-383.000.

Boyadjieff, George I., to Varco International, Inc. Top drive well drilling apparatus. 4,421,179., Cl. 173-44.000.

Boyer, Albert E.; Callahan, John T.; and Filocamo, Peter P., to Western Electric Company, Inc. Wave-soldering a member to an article. 4,421,265., Cl. 228-180.00R.

Bozler, Carl O.: *See*—
Leonberger, Frederick J.; Melngailis, Ivars; Bozler, Carl O.; and McClelland, Robert W., 4,420,873., Cl. 29-576.00E.

Brabets, Robert I.: *See*—
Massey, Lester G.; George, David A.; Brabets, Robert I.; and Abel, William A., 4,421,722., Cl. 422-129.000.

Bradley, John S., to Exxon Research and Engineering Co. CO Hydrogenation and alcohol homologation by means of soluble group VIII homogeneous catalysts. 4,421,862., Cl. 518-700.000.

Bradley, Richard S., to Weigh-Tronix, Inc. Fork lift scale. 4,421,186., Cl. 177-139.000.

Bradt, Gordon E. Kinetic clock sculpture. 4,421,421., Cl. 368-229.000.

Brager, Howard R.: *See*—
Bates, John F.; Brager, Howard R.; and Paston, Michael M., 4,421,572., Cl. 148-12.00E.

Brand, Leonard J.; and Nadelson, Jeffrey, to Sandoz, Inc. Isoxazolyl indolamines as hypoglycemics. 4,421,752., Cl. 424-248.400.

Brandenstein, Manfred: *See*—
Olschewski, Armin; Brandenstein, Manfred; and Walter, Lothar, 4,421,363., Cl. 308-6.00C.

Brandstetter, Franz: *See*—
McKee, Graham E.; Brandstetter, Franz; Echte, Adolf; Hambrecht, Juergen; Overhoff, Heinz-Juergen; Priebe, Edmund; Schwaab, Josef; and Siebel, Peter, 4,421,875., Cl. 523-335.000.

Brannstrom, Roine; and Karlsson, Lars-Erik, to Stal-Laval Turbine AB. Plant for the combustion of impure solid fuel. 4,421,036., Cl. 110-186.000.

Brannstrom, Roine, to Stal-Laval Turbin A.B. Power plant with a gas turbine for operation of a generator. 4,421,989., Cl. 290-40.00R.

Branson, Josses & Branson: *See*—
Webster, Kenneth, 4,420,925., Cl. 56-15.900.

Brass, John R., to Metropolitan Furniture Corp. Luminaire with improved illumination of a visual task field. 4,422,134., Cl. 362-300.000.

Braun, Burkhard; Vosteen, Bernhard; Skerhut, Reiner; and Sinn, Adolf, to Bayer Aktiengesellschaft. Thin film contact dryer. 4,420,892., Cl. 34-183.000.

Braun, Helmut; Rinno, Helmut; and Stelzel, Werner, to Hoechst Aktiengesellschaft. Aqueous dispersion paints and process for making the same. 4,421,889., Cl. 524-381.000.

Brenner, Robert A.; Clearman, Jack F.; and Platt, Clark I., to Whirlpool Corporation. Liquid pumping agitator with barrel valve for automatic washers. 4,420,952., Cl. 68-53.000.

Breuker, Eberhard. Method for biological screening. 4,421,849., Cl. 435-32.000.

Brewerton, David; and Connell, Peter P. R., to Racal-Dana Instruments Limited. Frequency modulator including frequency synthesizer. 4,422,053., Cl. 332-16.00R.

Briant, Jacqueline L.; and Asher, Jeffrey A., to General Electric Company. Humidity sensor. 4,422,129., Cl. 361-433.000.

Brichard, Jean, to Interox (Societe Anonyme). Process for the stabilization of particles containing peroxygen compounds and bleaching compositions containing particles stabilized according to this process. 4,421,669., Cl. 252-186.250.

Bridgestone Tire Company Limited: *See*—
Miyake, Itsuo; Okamoto, Keizo; Bundo, Motonori; and Noda, Akihiro, 4,421,891., Cl. 524-495.000.
Yamazaki, Noboru; Okuyama, Michio; and Tomita, Seisuke, 4,421,899., Cl. 525-189.000.

Briggs, Peter J.; and McAloon, Kevin, to Imperial Chemical Industries PLC. Fibrous composite materials and the production and use thereof. 4,421,815., Cl. 428-198.000.

Brinkerhoff, Kenneth W.: *See*—
Keller, Bruce E.; Andrews, Robert B., Jr.; Wylie, Charles F.; and Brinkerhoff, Kenneth W., 4,422,150., Cl. 364-475.000.

Brinkers, Bernardus H. C.; and Veenman, Willem B. A. N., to Koninklijke Brinkers Margarinefabrieken B.V. Method and device for rolling a dough mass into a continuous sheet. 4,421,776., Cl. 426-502.000.

Brixius, Darryl W., to Tarkett AB. Water based ink compositions using organic acid. 4,421,561., Cl. 106-27.000.

Broadwith, Brian E.; and Skinner, Robert T. J., to Lucas Industries Limited. Fuel injection pumping apparatus. 4,421,084., Cl. 123-365.000.

Broberg, Dewey O., Jr., to Du-Bro Products, Inc. Device for forming eyes and loops in wire. 4,421,145., Cl. 140-104.000.

Brockway Glass Company, Inc.: *See*—
Dembicki, Michael T.; and Poad, William J., 4,421,580., Cl. 156-69.000.
Poad, William J.; De Santis, Urbano J.; and McFadden, Lewis W., 4,421,542., Cl. 65-158.000.

Brook, Richard J.: *See*—
Claussen, Nils; Petzow, Gunter; and Brook, Richard J., 4,421,861., Cl. 501-103.000.

Brooks, Rodney A.: *See*—
Friauf, Walter S.; and Brooks, Rodney A., 4,421,986., Cl. 250-369.000.

Brosius, Klaus; and Herrmann, Berthold, to Voith Getriebe KG. Hydrodynamic torque-transfer unit, especially a hydrodynamic brake. 4,421,213., Cl. 188-296.000.

Brother Kogyo Kabushiki Kaisha: *See*—
Hirose, Noboru, 4,421,441., Cl. 408-17.000.

Brouwer, Charles W., to Leesona Corporation. Fabric selvage forming. 4,421,141., Cl. 139-54.000.

Brown Boveri Electric Inc.: *See*—
Davis, Lee A., 4,422,039., Cl. 324-119.000.

Brown International Corporation: *See*—
Holbrook, Franklin K., 4,421,021., Cl. 99-504.000.

Brown, Milton F., Jr. Rotary actuation device. 4,421,342., Cl. 280-740.000.

Brown, William F. Three-fingered spinner game of chance. 4,421,316., Cl. 273-274.000.

Brudney, Norman: *See*—
Stock, Karl-Wilhelm; Brudney, Norman; and Wienecke, Horst G. P., 4,421,771., Cl. 426-94.000.

Brueske, Ralph H., to Butler Manufacturing Company. Panel locator. 4,421,242., Cl. 212-218.000.

Bruhn, Hans-Athanas: *See*—
Gruber, Werner; and Bruhn, Hans-Athanas, 4,421,909., Cl. 528-362.000.

Bruhnke, Ulrich; Schoppel, Roman; and Harloff, Bernd, to Daimler-Benz Aktiengesellschaft. Arrangement for limiting bumper movement. 4,421,351., Cl. 293-132.000.

Bruninx-Poesen, Leonce M. J.; Drop, Peter C.; Kaldenhoven, Lambert C. I.; Lorenz, Roland; and Endevoets, Willy J. C., to U.S. Philips Corporation. High-pressure mercury vapor discharge lamp. 4,422,011., Cl. 313-642.000.

Brunnmueller, Fritz; Schneider, Rolf; Kroener, Michael; Mueller, Hans; and Linhart, Friedrich, to BASF Aktiengesellschaft. Linear basic polymers, their preparation and their use. 4,421,602., Cl. 162-168.200.

Bruton, Billy R.; and Snyder, David E., to Axelson, Inc. Heat sensitive gate valve. 4,421,134., Cl. 137-72.000.

Bryce, Rodney H.: *See*—
Greding, Robert; and Bryce, Rodney H., 4,420,996., Cl. 83-13.000.

Bucher-Guyer A.G.: *See*—
Vogt, Willy, 4,421,471., Cl. 425-421.000.

Buchtel, Dean H., to Hoover Company, The. Remote switch actuation. 4,421,964., Cl. 200-157.000.

Buell Industries, Inc.: *See*—
Becker, Philip D., 4,420,848., Cl. 10-72.00R.

Buffet, Jean, to Air Industrie. Thermo-electric installations. 4,420,940., Cl. 62-3.000.

Buhler, Ulrich: *See*—
Stahl, Theo; and Buhler, Ulrich, 4,421,516., Cl. 8-464.000.

Buhr, Gerhard; and Geus, Marie-Luise, to Hoechst Aktiengesellschaft. Process for the preparation of relief copies. 4,421,844., Cl. 430-326.000.

Buljan, Sergej-Tomislav; and Sarin, Vinod K., to GTE Laboratories Incorporated. Process for making a modified silicon aluminum oxynitride based composite cutting tool. 4,421,528., Cl. 51-309.000.

Buljan, Sergej-Tomislav: *See*—
Sarin, Vinod K.; Buljan, Sergej-Tomislav; and D'Angelo, Charles, 4,421,525., Cl. 51-295.000.

Bundo, Motonori: *See*—
Miyake, Itsuo; Okamoto, Keizo; Bundo, Motonori; and Noda, Akihiro, 4,421,891., Cl. 524-495.000.

Burger, Rainer; and Kleininger, Werner, to M.A.N.-ROLAND Druckmaschinen Aktiengesellschaft. Printing plate attachment system. 4,421,024., Cl. 101-415.100.

Burgin, Kermit H. Apparatus for producing and collecting a liquid extract and a dry by-product from a mash. 4,421,022., Cl. 100-98.00R.

Burke, John A., to Greene, Tweed & Co., Inc. Oil well string member with static seal. 4,421,323., Cl. 277-12.000.

Burke, John A., to Greene, Tweed & Co., Inc. Antifriction fluid seal assembly. 4,421,330., Cl. 277-188.00R.

Burke, John W., Jr.: *See*—
Edwards, Rodney, Jr.; Burke, John W., Jr.; and Gazzara, Peter, 4,421,120., Cl. 128-725.000.

Burkhead, Lowell E., to Rockwell International Corporation. Transformer coupled up-down converter. 4,422,139., Cl. 363-21.000.

Burkholder, Harvey R.; and Fanslow, Glenn E., to Iowa State University Research Foundation, Inc. Method of recovering adsorbed liquid compounds from molecular sieve columns. 4,421,651., Cl. 210-672.000.

Burleigh, Malcolm B., to Minnesota Mining and Manufacturing Company. Colorimetric indicators. 4,421,719., Cl. 422-57.000.

Burlington Industries, Inc.: *See*—
Allen, Danny H.; and Sumner, John H., 4,421,140., Cl. 139-1.00E.
Pugh, Charles D., 4,421,144., Cl. 139-370.200.

Burnett, Thomas R., to Northern Telecom Limited. Anti-static tray for semi-conductor devices and components. 4,421,233., Cl. 206-503.000.

Burns, Robert B., to Texaco Development Corporation. Tension leg platform system. 4,421,436., Cl. 405-60.000.

Burovoi, Isaak A.: *See*—
Abishev, Dzhantore N.; Malyshev, Vitaly P.; Bauer, Ivan K.; Yarygin, Vladimir A.; Maisakov, Mikhail E.; Gainutdinov, Garifulla K.; Nazarov, Alexandr M.; Kusainov, Temirkhan A.; Burovoi, Isaak A.; and Omarov, Bulat N., 4,422,174., Cl. 373-115.000.

Burow, Kenneth W., Jr.; and St. Clair, Roger L., to Eli Lilly and Company. Aquatic method. 4,421,546., Cl. 71-66.000.

Burr, Gary D.: *See*—
Farkas, Thomas P.; Burr, Gary D.; and Smith, Robert W., 4,420,965., Cl. 374-43.000.

Burril, Peter M.; and Westall, Stephen, to Dow Corning Limited. Treating textile fibres. 4,421,796., Cl. 427-387.000.

Burroughs Corporation: *See*—
Romania, Samuel R.; and Smith, Grant M., 4,421,161., Cl. 165-80.00C.

Burton, Colin K., to S. C. Johnson & Son, Inc. Hair conditioning composition and process for producing the same. 4,421,740., Cl. 424-70.000.

Bush Boake Allen: *See*—
Goodridge, Francis; Montgomery, Anthony J.; and Wright, Alan R., 4,421,613., Cl. 204-74.000.

Busse, Wilfried. Method of pressure fitting a tube in a tube sheet. 4,420,867., Cl. 29-421.00R.

Buthe, Ingolf; Straehle, Wolfgang; Marx, Matthias; and Peters, Reinhard, to BASF Aktiengesellschaft. Process for the preparation of elastic flexible polyurethane foams. 4,421,872., Cl. 521-174.000.

Butler Manufacturing Company: *See*—
Brueske, Ralph H., 4,421,242., Cl. 212-218.000.

Butzen, Thomas J. Vent damper drive. 4,421,096., Cl. 126-285.00B.

Buzio, Pierpaolo; Edefonti, Lucio; and Argela', Gianluigi, to Societa' Italiana Resine S.I.R. S.p.A. Heat-sealable polyolefin films and processes for their preparation. 4,421,780., Cl. 427-40.000.

Byer, Robert L.; and Fejer, Martin M., to Leland Stanford Junior University, The Board of Trustees of the. Apparatus for growing crystal fibers. 4,421,721., Cl. 422-109.000.

Byggergonomilaboratoriet HB: *See*—
Andersson, Roland; Hoglund, Per-Erik; and Glimskar, Bo, 4,421,181., Cl. 173-162.00H.

Byrne, Kenneth G., to United States of America, Energy. Explosive actuated valve. 4,421,005., Cl. 89-1.00B.

C. Otto & Comp. G.m.b.H.: *See*—
Koch, Friedbert; and Schweinsberg, Bernhard, 4,421,623., Cl. 204-206.000.

C T Manufacturing, Inc.: *See*—
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Cabrera, Rene J.; Guay, George W.; and Bookwalter, John R., to Codman & Shurtleff, Inc. Surgical retractor holder. 4,421,108., Cl. 128-20.000.

Cahen, David: *See*—
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Cain, Robert W. Apparatus for injecting material into a well-bore. 4,421,166., Cl. 166-162.000.

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Callahan, John T.: *See*—
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Calton, Gary J.: *See*—
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Updike, Mark H.; and Calton, Gary J., 4,421,854., Cl. 435-116.000.

Cambridge Products, Ltd.: *See*—
Jackson, Dennis E., 4,421,858., Cl. 436-20.000.

Cameron, James C., to McGean-Rohco, Inc. Acetylenic compositions and nickel plating baths containing same. 4,421,611., Cl. 204-43.00T.

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Canadian General Electric Company Limited: *See*—
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Hill, Walter A.; Stevenson, Andrew C.; and McKenna, Peter G., 4,422,022., Cl. 318-376.000.

Cannella, Samuel M., to E-Z Way Products, Inc. Apparatus for dispensing granular material. 4,421,147., Cl. 141-362.000.

Canon Kabushiki Kaisha: *See*—
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Horyu, Sakae, 4,421,950., Cl. 179-2.0DP.
Hosono, Nagao; Kinoshita, Koichi; and Takahashi, Toru, 4,421,057., Cl. 118-657.000.
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Kagiura, Kazuo; Miyake, Hiroyuki; Kasama, Nobuhiro; Sagara, Seiji; Sasaki, Nobukazu; and Yonemori, Takaji, 4,421,401., Cl. 355-3.0FU.
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,421,402., Cl. 355-8.000.
Matsumura, Isao; Ishikawa, Yasuyuki; Hirano, Reiji; Maruyama, Shigeo; and Kohayakawa, Yoshimi, 4,421,391., Cl. 351-211.000.
Noda, Atsushi; and Hanakata, Takayoshi, 4,421,428., Cl. 400-120.000.
Sato, Tadashi; Tsunoi, Haruo; and Kishi, Hirotoshi, 4,421,403., Cl. 355-8.000.
Suzuki, Takashi; Iizuka, Kiyoshi; Ohtaka, Keiji; and Mizutani, Hidemasa, 4,421,398., Cl. 354-200.000.
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Canron Corporation: *See*—
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Cap, Heinrich, to Papst Motoren GmbH & Co. KG. Device for adjusting sound head platforms. 4,422,116., Cl. 360-109.000.

Carbomedics, Inc.: *See*—
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Carl Schmale KG: *See*—
Freermann, Johannes; and Malcherek, Dieter, 4,421,044., Cl. 112-262.300.

Carl-Zeiss-Stiftung, Heidenheim/Brenz: *See*—
Kuhne, Christoph, 4,421,980., Cl. 250-231.0SE.

Carlsen, W. John, to GTE Laboratories Incorporated. Optical fiber connectors. 4,421,383., Cl. 350-96.210.

Carnaud S.A.: *See*—
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Sacchetti, Massimo; Aguzzi, Giovanni; Bianchi, Gianvittorio; and Caroprese, Giuseppe, 4,421,532., Cl. 55-28.000.

Carpco, Inc.: *See*—
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Carrier Corporation: *See*—
Duncan, John R.; Rohrberg, Roderick G.; Moyer, Ross A.; and Wright, William E., Sr., 4,421,972., Cl. 219-137.0PS.
Jacobs, John J., 4,421,460., Cl. 417-53.000.

Carter, Harry R.; and Carter, Randall R., to Pocal Industries, Inc. Percussion fuse for training projectiles. 4,421,031., Cl. 102-252.000.
Carter, Randall R.: *See—*
Carter, Harry R.; and Carter, Randall R., 4,421,031., Cl. 102-252.000.
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Casas, Raul E.: *See—*
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Casati, Francois M.: *See—*
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Morishige, Morio; and Sone, Hironao, 4,421,419., Cl. 368-73.000.
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Casseday, Michael W.: *See—*
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Cassinelli, Giuseppe; Grein, Arpad; Merli, Sergio; and Rivola, Giovanni, to Farmitalia Carlo Erba S.p.A. Antitumor antibiotics. 4,421,851., Cl. 435-78.000.
Castellano, Thomas P.; and Mandel, Nathan. Repeating firearm. 4,421,009., Cl. 89-140.000.
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Castleberry, Donald E., to General Electric Company. Method for fabrication of electroscopic display devices and transmissive display devices fabricated thereby. 4,420,896., Cl. 40-427.000.
Castleberry, Donald E., to General Electric Company. Electroscopic display devices. 4,420,897., Cl. 40-427.000.
Catenacci, Roberto: *See—*
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Cavlan, Napoleone, to Signetics Corporation. Field programmable logic array circuit. 4,422,072., Cl. 340-825.870.
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Celanese Corporation: *See—*
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Seiter, George M., 4,421,825., Cl. 428-332.000.
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Chan, Harvey T., Jr., to United States of America, Agriculture. Method for removing the outer waxy cutin-containing layer from papaya. 4,421,775., Cl. 426-482.000.
Chance, Ronald E.; and Hoffmann, James A., to Eli Lilly and Company. Process for producing an insulin. 4,421,685., Cl. 260-112.700.
Chandioux, Andre, to S.A. Automobiles Citroen; and Automobiles Peugeot. Device for supporting a steering and driving wheel of an automobile vehicle. 4,421,197., Cl. 180-258.000.
Chang, Ching-Jen; and Stevens, Travis E., to Rohm and Haas Company. Alkyl, poly(oxyethylene) poly(carbonyloxyethylene) acrylate emulsion copolymers for thickening purposes. 4,421,902., Cl. 526-317.000.
Chang, Richard S.; and Chodak, Jan B., to Mattel, Inc. Display system having multiple viewing stations. 4,421,313., Cl. 273-237.000.
Chapman, Claude L. Apparatus and methods for line stringing. 4,421,301., Cl. 254-134.30R.
Chappell, Richard C.: *See—*
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Chaussures Labelle: *See—*
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Chem-Y Fabriek van Chemische Produkten B.V.: *See—*
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Chemische Werke Huls AG: *See—*
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Muller, Wolfgang H. E.; and Hofmann, Peter, 4,421,691., Cl. 260-410.90R.
Chen, C. Gregory; and Wycklendt, Daniel A., to Eaton Corporation. Bridging contactor with main and arcing contacts. 4,421,959., Cl. 200-16.00A.
Chevron Research Company: *See—*
Abbott, Barry J.; and Silcox, William H., 4,421,438., Cl. 405-227.000.
Farnham, Robert A., 4,421,723., Cl. 422-218.000.
Chiang, John S.; and Goldstein, David, to FMC Corporation. Preparation of strontium carbonate. 4,421,729., Cl. 423-430.000.
Chicago Bridge & Iron Company: *See—*
Stafford, Donald C.; and Allo, Vincent F., 4,421,160., Cl. 165-76.000.
Chida, Yoshinori; and Tada, Satoru, to Seikosha Co., Ltd. Paper tractor. 4,421,262., Cl. 226-79.000.
Children's Medical Center Corporation, The: *See—*
Duffy, Frank H., 4,421,122., Cl. 128-731.000.
Chittick, Donald E., to Pyresco, Inc. Method for converting organic material into fuel. 4,421,524., Cl. 48-209.000.
Chlorine Engineers Corp. Ltd.: *See—*
Yamaguchi, Kenzo; Take, Yoshinari; and Manabe, Akiyoshi, 4,421,614., Cl. 204-98.000.
Chodak, Jan B.: *See—*
Chang, Richard S.; and Chodak, Jan B., 4,421,313., Cl. 273-237.000.
Cholet, Jacques, to Institut Francais du Petrole. Submerged device, carrying oceanography apparatuses, with automatic depth control. 4,421,049., Cl. 114-245.000.
Chore-Time Equipment, Inc.: *See—*
Frush, Don R.; and Coffman, Keith B., 4,421,060., Cl. 119-72.500.
Christe, Karl O.: *See—*
Wilson, William W.; and Christe, Karl O., 4,421,727., Cl. 423-253.000.
Christian, Donald K. Dual price cam system for totalizing vendor. 4,421,219., Cl. 194-1.00L.
Christian, Sherrell G. Archery arrow support device. 4,421,092., Cl. 124-41.00A.
Chrysler Corporation: *See—*
Woodcock, Stewart J., 4,420,993., Cl. 74-785.000.
Chuang, Patrick T.; and Keswick, Paul D., to Advanced Micro Devices, Inc. Sense amplification scheme for random access memory. 4,421,996., Cl. 307-530.000.
Chubachi, Noriyoshi: *See—*
Momii, Isao; Chubachi, Noriyoshi; and Kushibiki, Junichi, 4,420,979., Cl. 73-644.000.
Chugai Ro. Kogyo Co., Ltd.: *See—*
Tokitsu, Tetsuya; Harada, Saburo; Yamasaki, Jiro; and Nakama, Akihiro, 4,421,480., Cl. 432-238.000.
Chung, Frank H. Y., to Nutrisearch Company. Method for improving the yield of chocolate cake. 4,421,777., Cl. 426-553.000.
Churchland, Mark T.: *See—*
Barnes, Derek; Churchland, Mark T.; Herndier, Arnold W.; and Welsh, James K., 4,421,149., Cl. 144-366.000.
Chylinski, Victoria S.: *See—*
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Ciba-Geigy Corporation: *See—*
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Maier, Ludwig; and Durr, Dieter, 4,421,548., Cl. 71-86.000.
Sallmann, Alfred; and Baschang, Gerhard, 4,421,765., Cl. 424-309.000.
Cielakie, Edward W.: *See—*
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Cimarusti, Christopher M.: *See—*
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Cities Service Company: *See—*
Mueller, Richard A., 4,420,866., Cl. 29-421.00R.
Withjack, Eric M., 4,421,943., Cl. 136-246.000.
Claar, Terry D.; and Petri, Randy J., to Institute of Gas Technology. High-temperature direct-contact thermal energy storage using phase-change media. 4,421,661., Cl. 252-70.000.
Claas OHG: *See—*
Fredriksen, Nils, 4,421,188., Cl. 180-327.000.
Clanton, Richard A.; and Simmons, Raymond W., to Concept P.R. Inc. Finger light. 4,422,131., Cl. 362-186.000.
Clark Equipment Company: *See—*
Robinson, Richard H., Jr., 4,421,208., Cl. 187-9.00E.
Clark, Keith H.; and Scott, Donald R., to United States of America, National Aeronautics and Space Administration. Electrical self-aligning connector. 4,421,371., Cl. 339-64.00M.
Clark, Rodney L.; Landis, William R.; Patton, Paul B.; and Yancey, Charles B., to Honeywell Inc. Dynamic self-checking safety circuit means. 4,422,067., Cl. 340-508.000.
Clarke, Howard Y. Implement for flame treating soil. 4,420,901., Cl. 47-1.440.
Clarke, Peter A.: *See—*
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Clauning, Rudiger; and Schunter, Werner, to Teroson GmbH. Sheet-like sealing web. 4,421,807., Cl. 428-41.000.
Claussen, Nils; Petzow, Gunter; and Brook, Richard J., to Max-Planck-Gesellschaft zur Fuorderung der Wissenschaften e.v. High-strength and temperature-change resistant ceramic formed body, especially of mullite, its production and use. 4,421,861., Cl. 501-103.000.
Clawson, Lawrence G., to Raytheon Company. Method and apparatus for refrigerator defrost. 4,420,943., Cl. 62-81.000.
Clay, Bobby L., to Cevco, Inc. Bag fastener. 4,420,857., Cl. 24-16.0PB.

Clearman, Jack F.; Hageman, James R.; and Platt, Clark L., to Whirlpool Corporation. Filter and dispenser system for automatic washers. 4,420,951., Cl. 68-17.00R.

Clearman, Jack F.: *See*—
Brenner, Robert A.; Clearman, Jack F.; and Platt, Clark L., 4,420,952., Cl. 68-53.000.

Close, Donald, to David Hudson, Inc. Fluoroelastomer film compositions and solutions containing epoxy resin adducts. 4,421,878., Cl. 523-454.000.

Closson, William J.: *See*—
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CNG Research Company: *See*—
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Codman & Shurtleff, Inc.: *See*—
Cabrera, Rene J.; Guay, George W.; and Bookwalter, John R., 4,421,108., Cl. 128-20.000.

Coen Company, Inc.: *See*—
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Coffee, Ronald A.; and Bennett, Peter C., to Imperial Chemical Industries PLC. Containers and holders therefor for use in electrostatic spraying. 4,421,281., Cl. 239-690.000.

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Aubert, Jean-Paul, 4,421,136., Cl. 137-340.000.

Cogswell, Richard B.: *See*—
Orem, Howard L., 4,420,891., Cl. 33-476.000.

Cohen, Edgar C. Vacuum-compression injector. 4,421,508., Cl. 604-70.000.

Cohen, Malcolm M.; Palumbo, James J.; Johanson, David C.; and Nelson, John G., to United States of America, Navy. Visual field perimeter and psychomotor tracking performance measuring apparatus. 4,421,393., Cl. 351-224.000.

Coldren, Daniel R., to AMP Incorporated. Flag-type terminal having insulation displacement wire connection. 4,421,375., Cl. 339-97.00R.

Coleman, Ernest W. Storm warning method and apparatus. 4,422,037., Cl. 324-72.000.

Colgate-Palmolive Company: *See*—
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Collectors Box, The: *See*—
Ross, John, 4,421,017., Cl. 99-421.00R.

Collins, Earl R., Jr. Flexible drive apparatus for boring lateral bore holes from well. 4,421,183., Cl. 174-114.000.

Colt Industries Operating Corp.: *See*—
Rossomme, Paul A.; Eckenrod, John J.; Kovach, Curtis W.; and Pinnow, Kenneth E., 4,421,557., Cl. 75-125.000.

Combustion Engineering, Inc.: *See*—
Llinares, Vincent, Jr., 4,421,039., Cl. 110-263.000.
Sullivan, Robert P., 4,421,070., Cl. 122-510.000.

Combustion Power Company, Inc.: *See*—
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Commissariat a l'Energie Atomique: *See*—
Bianchin, Christian; Deneuville, Alain F.; and Gerard, Philippe, 4,421,677., Cl. 252-501.100.

Compagnie Generale des Etablissements Michelin: *See*—
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Compagnie Internationale pour l'Informatique: *See*—
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Concept P.R. Inc.: *See*—
Clanton, Richard A.; and Simmons, Raymond W., 4,422,131., Cl. 362-186.000.

Conly, Douglas J., to International Business Machines Corporation. Job recovery technique in a document copier machine. 4,421,404., Cl. 355-14.0CU.

Connell, Peter P. R.: *See*—
Brewerton, David; and Connell, Peter P. R., 4,422,053., Cl. 332-16.00R.

Connolly, John F., to Wittek Golf Range Supply Co. Golf club display rack. 4,421,240., Cl. 211-60.00G.

Container Corporation of America: *See*—
Wischoff, Donald F., 4,421,267., Cl. 229-44.00R.

Cook, Edward J., to Safety Research & Engineering Corp. Tire pressure signalling device. 4,421,052., Cl. 116-34.00R.

Cooper, Glenn D.; Lee, Gim F., Jr.; and Shufelt, Rainey A., to General Electric Company. Polyphenylene ether molding compositions that include an alkenyl aromatic resin and an EPDM rubber. 4,421,883., Cl. 524-127.000.

Cooper Industries, Inc.: *See*—
Kosmowski, Wojciech B., 4,421,305., Cl. 269-287.000.

Coquillart, Michel, to Mavilor Systemes. Method of mounting and casting a flat rotor. 4,420,875., Cl. 29-597.000.

Cormier, Milton J., to University of Georgia Research Foundation, Inc. Use of 9-anthroylcholine in the uterus to prevent pregnancy. 4,421,764., Cl. 424-308.000.

Correge, Philippe; and Gay, Lucien, to Societe Nationale Elf Aquitaine (Production). Filtering device. 4,421,646., Cl. 210-291.000.

Cosar, Paul, to Fives-Cail Babcock. Production of cement clinker. 4,421,563., Cl. 106-100.000.

Cosden Technology, Inc.: *See*—
Watson, James M.; Grootjans, Jacques F. J.; and Delorme, Luc F. L. N., 4,421,640., Cl. 208-326.000.

Cosmos, Pete; and McCleerey, Earl W., to AMP Incorporated. Snap-on cable clamp. 4,421,376., Cl. 339-103.00M.

Cothran, William B.: *See*—
Safrit, Sam C.; and Cothran, William B., 4,421,258., Cl. 223-75.000.

Cotton, Vernon. Vehicle lift attachment. 4,421,449., Cl. 414-685.000.

Couch, Richard W., Jr., to Hypertherm, Incorporated. Cooling and height sensing system for a plasma arc cutting tool. 4,421,970., Cl. 219-121.0PV.

Couper, Robert A.; Frediani, John K.; and Lillie, Terrance L., to Pitney Bowes Inc. Circuit for controlling character attributes in a word processing system having a display. 4,422,070., Cl. 340-723.000.

Courtaulds Limited: *See*—
Aldred, Fred C.; and Moseley, Charles R., 4,421,583., Cl. 156-167.000.

Cousinc, Bernard A., to Cousino Corporation. Automatic cat feeder. 4,421,059., Cl. 119-51.120.

Cousino Corporation: *See*—
Cousino, Bernard A., 4,421,059., Cl. 119-51.120.

Covitch, Michael J.; DeRespiris, Donald L.; Benezra, Leo L.; and Vauss, Elvin M., to Diamond Shamrock Corporation. Method of making solid polymer electrolytes and electrode bonded with hydrophyllic fluorocopolymers. 4,421,579., Cl. 156-60.000.

Cowan, Jack C., to Venture Chemicals, Inc. Organophilic polyphenolic acid additives for well-working compositions. 4,421,655., Cl. 252-8.50M.

Cowher, Melvyn E.: *See*—
Shuskus, Alexander J.; and Cowher, Melvyn E., 4,421,592., Cl. 156-613.000.

Cox, Gerald A., Sr.: *See*—
Dibrell, Edwin W., 4,420,944., Cl. 62-86.000.
Dibrell, Edwin W., 4,420,945., Cl. 62-86.000.

Cox, Roger B.; Steer, David C.; and Woodward, John R., to Lever Brothers Company. Bleach composition. 4,421,668., Cl. 252-174.120.

Cox, Terry L.: *See*—
Dibrell, Edwin W., 4,420,944., Cl. 62-86.000.

Craig Medical Products Limited: *See*—
Steer, Peter L.; and Edwards, John V., 4,421,511., Cl. 604-329.000.

Craig, Robert F.: *See*—
Bouchard, Andre C.; and Craig, Robert F., 4,421,493., Cl. 445-28.000.

Craighead, Harold G.; and Howard, Richard E., to Bell Telephone Laboratories, Incorporated. Optical information storage and retrieval. 4,422,159., Cl. 365-127.000.

Crane, Roscoe K.; and King, Alton B. Parabolic shaped heater. 4,421,094., Cl. 126-61.000.

Crawford, Thomas C., to Pfizer Inc. Ascorbic acid intermediates and their preparation. 4,421,924., Cl. 549-370.000.

Cremeen, Melvin L. Full wave communication antenna. 4,422,078., Cl. 343-895.000.

Creps, John L.; Fox, Robert J.; Guelde, Ted W.; Harms, Eugene H.; and McEwen, Stephen N., to Henry Filters, Inc. Compact universal drum filter settler. 4,421,645., Cl. 210-260.000.

Creusot-Loire: *See*—
Tillequin, Jean, 4,421,065., Cl. 122-155.00R.

Crews, George M., to Melamine Chemicals, Inc. High strength melamine-urea fertilizer granules. 4,421,545., Cl. 71-30.000.

Crichton, John F., to Robertshaw Controls Company. Thermocouple mounting system. 4,421,942., Cl. 136-217.000.

Croley, Thomas E., to Willamette Industries, Inc. Disposable container assembly for liquids or semi-liquids in bulk. 4,421,253., Cl. 222-105.000.

Croonquist, Arvid P.: *See*—
Elleman, Daniel D.; Croonquist, Arvid P.; and Wang, Taylor G., 4,420,977., Cl. 73-505.000.

Cross, Laurence A., Jr., to Randomatic Data Systems, Inc. Electromechanical retrieval device for randomly filed materials. 4,421,237., Cl. 209-612.000.

Cross, Leslie E.: *See*—
Safari, Ahmad; Newnham, Robert E.; Cross, Leslie E.; and Schulze, Walter A., 4,422,003., Cl. 310-358.000.

Crown Zellerbach Corporation: *See*—
Hostetler, Ronald E., 4,421,600., Cl. 162-111.000.

Cullen, Donald E.; Montress, Gary K.; Gilden, Meyer; and Wagner, Robert A., to United Technologies Corporation. Strain relief technique for surface acoustic wave devices. 4,422,055., Cl. 333-151.000.

Cunningham, Franklin E.: *See*—
Wiker, Jan M.; and Cunningham, Franklin E., 4,421,770., Cl. 426-89.000.

Cunnington, Ian J.; and Evans, Harold R., to Tekron Licensing BV. Folding exercising equipment. 4,421,307., Cl. 272-72.000.

Curtis, Bernard J.; and Ebnoether, Martin, to RCA Corporation. Reverse etching of chromium. 4,421,593., Cl. 156-643.000.

Curwood, Inc.: *See*—
Theisen, Henry J.; and Gehrke, Willard H., 4,421,823., Cl. 428-349.000.

Cusano, Dominic A.; Greskovich, Charles D.; and DiBianca, Frank A., to General Electric Company. Rare-earth-doped yttria-gadolinia ceramic scintillators. 4,421,671., Cl. 252-301.40F.

Cutler, Alfred. Game. 4,421,315., Cl. 273-268.000.

Cymaticolor Corporation: *See*—
McCullion, Francis E., Jr., 4,421,026., Cl. 101-136.000.

Czech, Joachim. Dispenser for pasty products. 4,421,255., Cl. 222-387.000.

Czeiler, Andras; Kallai, Istvan; and Simenfalvi, Laszlo, to Egyesult Izzolampa es Villamossagi Rt. Glass envelope for electric light sources. 4,421,803., Cl. 428-35.000.

Daftary, Shashikumar H.: *See*—
Kourtz, Raymond E.; and Daftary, Shashikumar H., 4,421,707., Cl. 264-182.000.

Dahlke, Milton F., to Armco Inc. Electrode column snubber for electric arc furnace electrodes. 4,422,173., Cl. 373-94.000.

Dai Nippon Printing Co., Ltd.: *See*—
Takiguchi, Ryohei; and Nagashima, Masayoshi, 4,421,839., Cl. 430-164.000.

Daikin Kogyo Co., Ltd.: *See*—
Hattori, Shuzo; Morita, Shinzo; and Fujii, Tsuneo, 4,421,842., Cl. 430-296.000.
Hattori, Shuzo; Morita, Shinzo; and Fujii, Tsuneo, 4,421,843., Cl. 430-322.000.

Daimler-Benz Aktiengesellschaft: *See*—
Bruhnke, Ulrich; Schoppel, Roman; and Harloff, Bernd, 4,421,351., Cl. 293-132.000.
Dudeck, Ingo; and Maass, Manfred, 4,420,968., Cl. 73-35.000.

Dainippon Ink and Chemicals, Inc.: *See*—
Tsuda, Katsuhiro; Tanaka, Hisao; Nagae, Michio; and Imanaga, Yasuhiko, 4,421,885., Cl. 524-295.000.

Daito Koeki Kabushiki Kaisha: *See*—
Shinohara, Tatsuo; Oguri, Yukihiro; Fujimori, Yukio; and Kondo, Hiroyuki, 4,421,756., Cl. 424-258.000.

Dalton, Augustine L, Jr.; Sheridan, John J., III; and Zagnoli, David A., to Air Products and Chemicals, Inc. Process for removing oxygen from mixed gas streams using a swing adiabatic absorption-isothermal desorption cycle. 4,421,530., Cl. 55-26.000.

Dalton, Augustine L, Jr.; Sheridan, John J., III; and Zagnoli, David A., to Air Products and Chemicals, Inc. Adiabatic pressure swing absorption process for removing low concentrations of oxygen from mixed gas streams. 4,421,531., Cl. 55-26.000.

Danby, Hal C.; and Ritson, Carl, to Anatros Corporation. Flow-regulating enteric feeding pump. 4,421,506., Cl. 604-34.000.

D'Angelo, Charles: *See*—
Sarin, Vinod K.; Buljan, Sergej-Tomislav; and D'Angelo, Charles, 4,421,525., Cl. 51-295.000.

Daniels, Michael J.; and Farmer, Digby M., to Tate & Lyle Limited. Immobilization of enzymes. 4,421,850., Cl. 435-41.000.

Danielssen, Tore: *See*—
Bjune, Arne; Boe, Gunnar H.; and Danielssen, Tore, 4,421,616., Cl. 204-115.000.

Dannatt, Hugh St. L., to Pitney Bowes Inc. Folded beam adjustment. 4,421,400., Cl. 355-1.000.

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Daugherty, Andrew H.: *See*—
Vermette, Howard H.; and Daugherty, Andrew H., 4,421,209., Cl. 187-9.00R.

Davco, Inc.: *See*—
Davis, Leland L., 4,421,090., Cl. 123-557.000.

David Hudson, Inc.: *See*—
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Davies, Glyndwr J., to AEPLC. Plastics alloy compositions. 4,421,588., Cl. 156-308.200.

Davies, Glyndwr J., to Glacier Metal Company Limited, The. Method of applying a coating of polyarylene sulphide to a cooking utensil. 4,421,795., Cl. 427-385.500.

Davis Instruments: *See*—
MacDonald, Angus, 4,421,407., Cl. 356-144.000.

Davis, Lee A., to Brown Boveri Electric Inc. Self-powered ammeter. 4,422,039., Cl. 324-119.000.

Davis, Leland L., to Davco, Inc. Fuel processor apparatus for diesel engine powered vehicles. 4,421,090., Cl. 123-557.000.

Davis, Steven J.; and Hanko, Leonard, to United States of America, Air Force. Halogen mass flow rate detection system. 4,421,408., Cl. 356-246.000.

Davis, Walter L.; and Kraul, Douglas R., to Motorola, Inc. Non-dissipative memory system. 4,422,162., Cl. 365-227.000.

Davis, Warren E.; and Granger, Donald W. Nitrogen liquid to gas converter employing water heat exchangers. 4,420,942., Cl. 62-53.000.

De Forenede Bryggerier A/S: *See*—
Munck, Lars; Gibbons, Gregory C.; and Feil, Carol, 4,421,772., Cl. 426-231.000.

Dearth, James D.; and Wolcott, Herbert B., Jr., to Atlantic Richfield Company. Protective sheath for high temperature process wells. 4,421,169., Cl. 166-285.000.

DeCew, Alan: *See*—
Mastronardi, Richard; DeCew, Alan; and McMahon, David, 4,422,177., Cl. 378-17.000.

Deere & Company: *See*—
Haight, Robert E., 4,421,218., Cl. 192-106.00F.

de Graaf, Nicolaas R., to Nira International B.V. Paging receiver. 4,422,071., Cl. 340-825.440.

Dekker, Lambert: *See*—
Boden, Richard M.; Dekker, Lambert; Schmitt, Frederick L.; and Van Loveren, Augustinus G., 4,421,679., Cl. 252-522.00R.

DeKoker, Jon G., to Boeing Company, The. In-line fuze concept for antiarmor tactical warheads. 4,421,030., Cl. 102-218.000.

Del Mar Avionics: *See*—
Woods, Donald C., 4,422,081., Cl. 346-33.0ME.

de Labbey, Arnaud: *See*—
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DeLeu, Robert P.; and Thompson, Robert G., to Reliance Electric Company. Modular sheave. 4,421,498., Cl. 474-182.000.

Delgado, Pedro R.; and Spector, George. Foldable board game with card shuffler. 4,421,312., Cl. 273-236.000.

Deligny, Jean, to Societe Anonyme D.B.A. Mechanical control arrangement by a cable which is slideable axially in a flexible sheath. 4,420,988., Cl. 74-501.50R.

DeLigt, John, to Westvaco Corporation. Veneer butt-end splicer. 4,421,591., Cl. 156-508.000.

Deline, Gordon R.: *See*—
Bowden, Edgar A.; Deline, Gordon R.; and Koeijmans, Gerard D., 4,422,164., Cl. 367-15.000.

DeLisle, Richard W.; and Leblanc, Conrad, to DeLisle, Richard W. Massage and exercise mat. 4,421,110., Cl. 128-60.000.

Delorme, Jean J.: *See*—
Moll, Manfred; Delorme, Jean J.; and Weber, Jean C., 4,422,036., Cl. 324-71.400.

Delorme, Luc F. L. N.: *See*—
Watson, James M.; Grootjans, Jacques F. J.; and Delorme, Luc F. L. N., 4,421,640., Cl. 208-326.000.

Deltak Corporation: *See*—
Krowech, Robert J., 4,421,067., Cl. 122-390.000.

Demaschquie, Osama, to Eglasstrek Patent Promotion & Awarding GmbH. Device for the manufacture of glass filaments. 4,421,538., Cl. 65-1.000.

Dembicki, Michael T.; and Poad, William J., to Brockway Glass Company, Inc. Preparation of glass container for thermoplastic closure. 4,421,580., Cl. 156-69.000.

Demers, J. T. Maurice; and Stefanatos Peter G., to Doorlec Corporation/Corporation Doorlec. Instant reverse control circuit for a single phase motor. 4,422,029., Cl. 318-753.000.

Demidovich, Boris K.: *See*—
Bildjukevich, Viktor L.; Turovsky, Leonid N.; Meleshko, Vyacheslav J.; Yakimovich, Dmitry T.; Lebedkova, Valentina A.; Demidovich, Boris K.; Plavnik, Gennady Z.; Dubrovsky, Nikolai N.; Proskalovich, Evgeny A.; and Pivovarov, Alexandr I., 4,421,594., Cl. 159-4.00R.

Demoute, Jean-Pierre: *See*—
Martel, Jacques; Tessier, Jean; and Demoute, Jean-Pierre, 4,421,928., Cl. 560-177.000.

Demus, Dietrich: *See*—
Deutscher, Hans-Joachim; Richter, Sabine; Zaschke, Horst; Demus, Dietrich; and Boettger, Ute, 4,421,670., Cl. 252-299.620.

Deneuville, Alain F.: *See*—
Bianchin, Christian; Deneuville, Alain F.; and Gerard, Philippe, 4,421,677., Cl. 252-501.100.

den Hoedt, Gerrit: *See*—
ter Burg, Antonius W. M.; and den Hoedt, Gerrit, 4,421,439., Cl. 405-258.000.

Denneman, Jan W.; van Dam, Hendrik B. B.; and Wouters, Petrus F. J. A., to U.S. Philips Corporation. Electrodeless gas discharge lamp. 4,422,017., Cl. 315-248.000.

DeRespiris, Donald L.: *See*—
Covitch, Michael J.; DeRespiris, Donald L.; Benezra, Leo L.; and Vauss, Elvin M., 4,421,579., Cl. 156-60.000.

deRosset, Armand J.: *See*—
Kulprathipanja, Santi; and deRosset, Armand J., 4,421,567., Cl. 127-46.300.

De Santis, Urbano J.: *See*—
Poad, William J.; De Santis, Urbano J.; and McFadden, Lewis W., 4,421,542., Cl. 65-158.000.

DesMarais, Raymond C., Jr. Printed circuits. 4,421,944., Cl. 174-68.500.

Desserre, Jacques: *See*—
Helle, Michel; and Desserre, Jacques, 4,422,118., Cl. 360-126.000.

Deutsch, Ralph, to Kawai Musical Instrument Mfg. Co., Ltd. Adaptive accompaniment tone color for an electronic musical instrument. 4,421,002., Cl. 84-1.170.

Deutsche Forschungs- und Vesuchsanstalt fur Luft und Raumfahrt e.V.: *See*—
Mailander, Martin, 4,421,963., Cl. 200-147.00R.

Deutscher, Hans-Joachim; Richter, Sabine; Zaschke, Horst; Demus, Dietrich; and Boettger, Ute, to VEB Werk fur Fernschelektronik Berlin im VEB Kombinat Mikroelektronik. Liquid crystal dihydrophenanthrene substances. 4,421,670., Cl. 252-299.620.

DeVore, Robert E. Portable clothes closet. 4,421,260., Cl. 224-42.430.

Devro, Inc.: *See*—
Ziolko, Francis J., 4,420,856., Cl. 17-34.000.

DeWitt, Terry E.: *See*—
Long, Gene M.; DeWitt, Terry E.; and Bell, John R., III, 4,420,913., Cl. 52-57.000.

Dezael, Claude; and Franckowiak, Sigismond, to Institut Francais du Petrole. Process for purifying a gas containing hydrogen sulfide and carbon dioxide and apparatus therefor. 4,421,725., Cl. 423-228.000.

Diamond Shamrock Corporation: *See*—
Covitch, Michael J.; DeRespiris, Donald L.; Benezra, Leo L.; and Vauss, Elvin M., 4,421,579., Cl. 156-60.000.

Diaz, Rafael: *See*—
Arregui, Manuel; Diaz, Rafael; Gamon, Vicente; and Yarza, Javier, 4,421,073., Cl. 123-43.00R.

Diaz, Stephen H.: *See*—
Horsma, David A.; and Diaz, Stephen H., 4,421,582., Cl. 156-86.000.

DiBella, Eugene P., to Nuodex Inc. Thixotropic agents for organic solvent-based surface-coating compositions and surface-coating compositions containing same. 4,421,565., Cl. 106-180.000.

DiBianca, Frank A.: *See—*
Cusano, Dominic A.; Greskovich, Charles D.; and DiBianca, Frank A., 4,421,671., Cl. 252-301.40F.

Dibrell, Cooper Graham: *See—*
Dibrell, Edwin W., 4,420,945., Cl. 62-86.000.

Dibrell, Edwin W., to Cox, Gerald A., Sr.; and Cox, Terry L., part interest to each. Air cooling system. 4,420,944., Cl. 62-86.000.

Dibrell, Edwin W., to Cox, Gerald A., Sr.; Dibrell, T. Kellis; Dibrell, Samuel Dotson; Dibrell, Cooper Graham; and Fox, Terry L., part interest to each. Method and apparatus for extracting energy from a pressured gas. 4,420,945., Cl. 62-86.000.

Dibrell, Samuel Dotson: *See—*
Dibrell, Edwin W., 4,420,945., Cl. 62-86.000.

Dibrell, T. Kellis: *See—*
Dibrell, Edwin W., 4,420,945., Cl. 62-86.000.

Dichter, Michael; and Horowitz, Carl, to Sharon Tube Corp. Corrosion protection of steel pipes. 4,421,569., Cl. 148-6.14R.

Dickey, Fred M.; and Postlethwaite, Darrell M., to Boeing Company, The. Open area ratiometer. 4,421,409., Cl. 356-354.000.

Didier Engineering GmbH: *See—*
Holz, Peter; Patalon, Heinrich; and Hartkopf, Edgar, 4,421,481., Cl. 432-239.000.

Diehl GmbH & Co.: *See—*
Wich, Harald, 4,421,029., Cl. 102-207.000.

Dietrich, Lynn A.: *See—*
Harshman, Ronald W.; and Dietrich, Lynn A., 4,421,135., Cl. 137-312.000.

Diggins, Joseph P., to Foster Wheeler Energy Corporation. Desuperheater spray liner assembly. 4,421,069., Cl. 122-487.000.

Digital Equipment Corporation: *See—*
Spash, John L., 4,422,115., Cl. 360-104.000.

Digitronics Inventionering Corp.: *See—*
Schoenberg, Steve; and Ellis, David G., 4,421,800., Cl. 427-424.000.

Dillarstone, Alan: *See—*
Allen, Edwin; Dillarstone, Alan; and Reul, Joseph A., 4,421,657., Cl. 252-8.600.

Dingman, Robert D. Driven roller for accumulator conveyor. 4,421,224., Cl. 198-781.000.

Dinkel, Rolf: *See—*
Grayson, James I.; and Dinkel, Rolf, 4,421,921., Cl. 546-251.000.

Discovision Associates: *See—*
Vitale, George; and Wilkinson, Richard L., 4,422,169., Cl. 369-45.000.

Di Stefano, Michele L.: *See—*
Garcea, Giampaolo; Banfi, Ambrogio; and Di Stefano, Michele L., 4,421,074., Cl. 123-90.150.

Dixon, Thomas J.; and Kelm, Gary R., to Procter & Gamble Company, The. Skin conditioning composition. 4,421,769., Cl. 424-358.000.

Dr. Ing. h.c.F. Porsche Aktiengesellschaft: *See—*
Kramer, Volker; and Helsper, Gunter, 4,421,340., Cl. 280-478.00B.

Dr. Karl Thomae Gesellschaft mit beschrankter Haftung: *See—*
Benedikter, Lothar; and Kutter, Eberhard, 4,421,755., Cl. 424-256.000.

Dr. Werner Freyberg Chemische Fabrik Delitia Nachf.: *See—*
Friemel, Wolfgang F. R.; and Praxl, Werner O., 4,421,742., Cl. 424-128.000.

Doi, Yuzuru; Kakeda, Teruyuki; and Kawamura, Noriaki, to Asahi Kogaku Kogyo Kabushiki Kaisha. Fiber retaining device for power laser. 4,421,382., Cl. 350-96.200.

Dolan, Michael J.; McGovern, Stephen J.; and Owens, Peter J., to Mobil Oil Corporation. Inert gas enrichment in FCC unit regenerators. 4,421,636., Cl. 208-113.000.

Domrachev, Anatoly I.: *See—*
Mischenko, Anatoly I.; Talda, Gennady B.; Belogub, Alexandr V.; Podgorny, Anatoly N.; Makarov, Alexandr A.; Zhemerenko, Anatoly T.; Domrachev, Anatoly I.; and Efremov, Petr K., 4,421,072., Cl. 123-1.00A.

Doms, Manfred: *See—*
Schon, Romuald; Doms, Manfred; Vorberg, Peter; and Schroter, Horst, 4,421,394., Cl. 351-245.000.

Donatelli, Philip A.; and Keil, Joseph W., to Dow Corning Corporation. Silicone emulsifier composition, invert emulsions therefrom and method therefor. 4,421,656., Cl. 252-8.50P.

Doorlec Corporation/Corporation Doorlec: *See—*
Demers, J. T. Maurice; and Stefanatos Peter G., 4,422,029., Cl. 318-753.000.

Dorman, Linneaus C., to Dow Chemical Company, The. Method of coupling a protein to a polymer particle containing hydrazide groups in a polymer latex and the products formed therefrom. 4,421,896., Cl. 525-54.100.

Dorrfub, Klaus; and Krausser, Werner, to Triumph-Adler A.G. fur Buro- und Informationstechnik. Method for dot matrix printing at selected uniform dot column spacing. 4,421,431., Cl. 400-124.000.

Dow Chemical Company, The: *See—*
Dorman, Linneaus C., 4,421,896., Cl. 525-54.100.
Hayes, William V., 4,421,940., Cl. 568-948.000.
Revak, Timothy T.; and Krueger, Robert T., 4,421,529., Cl. 55-16.000.
Solc nee Hajna, Jitka, 4,421,660., Cl. 252-62.540.
Suh, Kyung W.; Krueger, David C.; and Zehner, Burch E., 4,421,866., Cl. 521-79.000.
Tollar, James E., 4,421,162., Cl. 165-140.000.
Watson, John D., Sr., 4,421,864., Cl. 521-26.000.
Woo, Edmund P., 4,421,929., Cl. 562-465.000.

Dow Corning Corporation: *See—*
Donatelli, Philip A.; and Keil, Joseph W., 4,421,656., Cl. 252-8.50P.
Haluska, Loren A.; and Molzahn, Marcelle G., 4,421,893., Cl. 524-588.000.
Plueddemann, Edwin P., 4,421,654., Cl. 210-698.000.

Dow Corning Limited: *See—*
Burril, Peter M.; and Westall, Stephen, 4,421,796., Cl. 427-387.000.

Dow, Julian; and Meyers, Paul F., to SmithKline Instruments, Inc. Ultrasonic transducer. 4,421,118., Cl. 128-660.000.

Drechsel, Arno. Articulated coupling particularly for adjusting the jet inclination of irrigators in general. 4,421,279., Cl. 239-546.000.

Drews, Ulrich: *See—*
Rapps, Peter; and Drews, Ulrich, 4,420,971., Cl. 73-118.000.

Dronkers, Peter, to Babcock & Wilcox Company, The. Nozzle penetration for a nuclear reactor pressure vessel closure. 4,421,714., Cl. 376-204.000.

Drop, Peter C.: *See—*
Bruninx-Poesen, Leonce M. J.; Drop, Peter C.; Kaldenhoven, Lambert C. I.; Lorenz, Roland; and Endevoets, Willy J. C., 4,422,011., Cl. 313-642.000.

Drygalski, Gordon T. Oil seals with mounting surface vent mechanisms. 4,421,326., Cl. 277-50.000.

Du-Bro Products, Inc.: *See—*
Broberg, Dewey O., Jr., 4,421,145., Cl. 140-104.000.

Dubrovsky, Nikolai N.: *See—*
Bildjukevich, Viktor L.; Turovsky, Leonid N.; Meleshko, Vyacheslav J.; Yakimovich, Dmitry T.; Lebedkova, Valentina A.; Demidovich, Boris K.; Plavnik, Gennady Z.; Dubrovsky, Nikolai N.; Proskalovich, Evgeny A.; and Pivovarov, Alexandr I., 4,421,594., Cl. 159-4.00R.

Dudeck, Ingo; and Maass, Manfred, to Daimler-Benz Aktiengesellschaft. Undesirable combustion characteristic detection apparatus. 4,420,968., Cl. 73-35.000.

Duffy, Frank H., to Children's Medical Center Corporation, The. Brain electrical activity mapping. 4,421,122., Cl. 128-731.000.

Dujari, Ghanshyam: *See—*
Amir, Gideon; Gregorian, Roubik; and Dujari, Ghanshyam, 4,422,155., Cl. 364-606.000.

Duncan, John R.; Rohrberg, Roderick G.; Moyer, Ross A.; and Wright, William E., Sr., to Carrier Corporation. Pulsed direct current arc welding. 4,421,972., Cl. 219-137.0PS.

Dunemann, Klaus; and Fritz, Harald, to Siemens Aktiengesellschaft. Arrangement for measuring the pressure in cylindrical cavities. 4,420,980., Cl. 73-730.000.

Dunn, Charles S.; and Seng, Stephen, to Owens-Corning Fiberglas Corporation. Electrode support mechanism and method. 4,422,172., Cl. 373-94.000.

Du Pont de Nemours, E. I., and Company: *See—*
Gorondy, Emery J., 4,421,517., Cl. 8-471.000.
Gorondy, Emery J., 4,421,518., Cl. 8-471.000.
Graham, Boynton, 4,421,619., Cl. 204-159.160.
Ida, Edward S., 4,421,411., Cl. 356-418.000.
Selby, Thomas P.; and Wolf, Anthony D., 4,421,550., Cl. 71-92.000.
Shenvi, Ashokkumar B., 4,421,916., Cl. 546-14.000.
Steinberg, Neil I., 4,421,709., Cl. 264-216.000.

Dupont, Gerard E., to s.a. PRB, societe anonyme. Exercise projectile. 4,421,033., Cl. 102-529.000.

Duranleau, Roger G., to Texaco Inc. Process for preparing low molecular weight oxygenated compounds from syngas using a novel catalyst system. 4,421,863., Cl. 518-701.000.

Durno, Ronald A., to United Technologies Corporation. Helicopter cyclic stick midposition feel indicator. 4,421,287., Cl. 244-223.000.

Durr, Dieter: *See—*
Maier, Ludwig; and Durr, Dieter, 4,421,548., Cl. 71-86.000.

Dusza, John P.: *See—*
Tomcufcik, Andrew S.; Meyer, Walter E.; and Dusza, John P., 4,421,753., Cl. 424-250.000.

DuVall, Dale R.; and Kockler, Barry C., to Mead Corporation, The. Document scanning apparatus. 4,422,100., Cl. 358-293.000.

Dyform Engineering Ltd.: *See—*
Netupsky, Boris, 4,420,915., Cl. 52-98.000.

Dynamic Controls Corporation: *See—*
Farkas, Thomas P.; Burr, Gary D.; and Smith, Robert W., 4,420,965., Cl. 374-43.000.

E.I. Du Pont de Nemours & Co.: *See—*
Gorondy, Emery J., 4,421,515., Cl. 8-444.000.

E. R. Squibb & Sons, Inc.: *See—*
Mueller, Richard H.; Cimarusti, Christopher M.; and Kissick, Thomas P., 4,421,686., Cl. 260-239.00A.

E-Systems, Inc.: *See—*
Wright, William A., 4,422,047., Cl. 330-51.000.

E-Z Way Products, Inc.: *See—*
Cannella, Samuel M., 4,421,147., Cl. 141-362.000.

Easco Corporation: *See—*
Stanton, Allyn K., 4,421,230., Cl. 206-378.000.

East, Anthony J., to Celanese Corporation. Preparation of polyesters by direct condensation of hydroxynaphthoic acids, aromatic diacids and aromatic diols. 4,421,908., Cl. 528-181.000.

Eastman Kodak Company: *See—*
Marsiglio, Carl M.; and Swapceinski, John P., 4,421,228., Cl. 198-814.000.
Muka, Richard S., 4,421,306., Cl. 271-5.000.
Ponticello, Ignazio S.; Hollister, Kenneth R.; and Tuites, Richard C., 4,421,915., Cl. 544-387.000.

Eaton Corporation: *See—*
Chen, C. Gregory; and Wycklendt, Daniel A., 4,421,959., Cl. 200-16.00A.

Eberbach, Steven J. Electroacoustic network. 4,421,949., Cl. 381-98.000.
Ebert, Michael: *See*—
Reick, Franklin G., 4,421,658., Cl. 252-32.70E.
Ebnoether, Martin: *See*—
Curtis, Bernard J.; and Ebnoether, Martin, 4,421,593., Cl. 156-643.000.
Echte, Adolf; Gausepohl, Hermann; and Gerberding, Karl, to BASF Aktiengesellschaft. Process for the manufacture of ABS polymers and use thereof in preparation of molded parts. 4,421,895., Cl. 525-53.000.
Echte, Adolf: *See*—
McKee, Graham E.; Brandstetter, Franz; Echte, Adolf; Hambrecht, Juergen; Overhoff, Heinz-Juergen; Priebe, Edmund; Schwaab, Josef; and Siebel, Peter, 4,421,875., Cl. 523-335.000.
Eckberg, Richard P.; and LaRochelle, Ronald W., to General Electric Company. Ultraviolet curable silicone coating compositions. 4,421,904., Cl. 528-27.000.
Eckell, Albrecht: *See*—
Lehner, August; Werther, Heinz U.; Naegele, Dieter; Lenz, Werner; Jun, Mong-Jon; Reimann, Horst; and Eckell, Albrecht, 4,421,840., Cl. 430-273.000.
Eckenrod, John J.: *See*—
Rossomme, Paul A.; Eckenrod, John J.; Kovach, Curtis W.; and Pinnow, Kenneth E., 4,421,557., Cl. 75-125.000.
Eckert, Alton B.: *See*—
Soderberg, John H.; Eckert, Alton B.; and McFiggans, Robert B., 4,422,148., Cl. 364-464.000.
Economics Laboratory, Inc.: *See*—
Anderson, Charles R.; and Oakes, Thomas R., 4,421,664., Cl. 252-94.000.
Edahiro, Tadao; Yoshida, Kazuaki; Ogura, Kunio; Shibuya, Seiji; and Murata, Hiroshi, to Nippon Telegraph & Telephone Public Corporation; and Furukawa Electric Co., Ltd., The. Method of producing rod-shaped base material for optical transmission fiber. 4,421,539., Cl. 65-3.120.
Edefonti, Lucio: *See*—
Buzio, Pierpaolo; Edefonti, Lucio; and Argela', Gianluigi, 4,421,780., Cl. 427-40.000.
Eden, Dayton D.: *See*—
Billingsley, James D.; and Eden, Dayton D., 4,421,985., Cl. 250-353.000.
Edixhoven, Gerardus H., to Hunter Douglas International N.V. Apparatus for making slats for a slatted blind. 4,420,862., Cl. 29-24.500.
Edstrom, Karl L.; and Hogstrom, Per A. W. System for indicating an emergency exit. 4,422,069., Cl. 340-691.000.
Edwards, John V.: *See*—
Steer, Peter L.; and Edwards, John V., 4,421,511., Cl. 604-329.000.
Edwards, Richard H.; and Kohler, George O., to United States of America, Agriculture. Heating of proteinaceous liquids. 4,421,682., Cl. 260-112.00R.
Edwards, Richard K. Multiple band frequency response controller. 4,422,048., Cl. 330-109.000.
Edwards, Rodney, Jr.; Burke, John W., Jr.; and Gazzara, Peter, to Biotrine Corporation. Peak respiratory flow monitor. 4,421,120., Cl. 128-725.000.
Eeco Incorporated: *See*—
Pargee, Robert W., Jr., 4,422,093., Cl. 358-12.000.
Efremov, Petr K.: *See*—
Mischenko, Anatoly I.; Talda, Gennady B.; Belogub, Alexandr V.; Podgorny, Anatoly N.; Makarov, Alexandr A.; Zhemerenko, Anatoly T.; Domrachev, Anatoly I.; and Efremov, Petr K., 4,421,072., Cl. 123-1.00A.
Efros, Boris. High speed cycle. 4,421,334., Cl. 280-236.000.
Egger, Caspar; Krebser, Rudolf; and Leuzinger, Hans, to Netstal-Maschinen AG. Injection molding machine assembly having means for selectively changing at least tool unit or a plasticizing and ejection unit. 4,421,469., Cl. 425-183.000.
Eglasstrek Patent Promotion & Awarding GmbH: *See*—
Demaschquie, Osama, 4,421,538., Cl. 65-1.000.
Egyesult Izzolampa es Villamossagi Rt.: *See*—
Czeiler, Andras; Kallai, Istvan; and Simenfalvi, Laszlo, 4,421,803., Cl. 428-35.000.
Eimers, Erich; Kraft, Klaus; and Margottie, Dieter, to Bayer Aktiengesellschaft. Use of 3,4-disubstituted anilines as accelerators for unsaturated polyester resins. 4,421,879., Cl. 523-500.000.
Eisai Co., Ltd.: *See*—
Hamano, Sachiyuki; Kitamura, Shinichi; Igarashi, Toshiji; and Nakajima, Yoshikage, 4,421,763., Cl. 424-285.000.
Yamagiwa, Satoshi; Taguchi, Yoshio; and Kayano, Masanori, 4,421,738., Cl. 424-35.000.
Eischen, Gaston; Eulenberg, Thomas; Gowert, Helmut; Grablowitz, Rainer; and Pernet, Michel, to Saint Gobain Industries. Process and device for the manufacture of glass by flotation. 4,421,541., Cl. 65-99.300.
El Paso Hydrocarbons Company: *See*—
Mehra, Yuv R., 4,421,535., Cl. 62-17.000.
Electronic Concepts, Inc.: *See*—
Lavene, Bernard, 4,422,127., Cl. 361-323.000.
Eli Lilly and Company: *See*—
Boisvenue, Rudolph J., 4,421,759., Cl. 424-273.00R.
Burow, Kenneth W., Jr.; and St. Clair, Roger L., 4,421,546., Cl. 71-66.000.
Chance, Ronald E.; and Hoffmann, James A., 4,421,685., Cl. 260-112.700.
Elings, Virgil B.; and Nicoli, David F., to University of California, The Regents of the. Homogeneous fluoroimmunoassay involving autocorrelation processing of optically sensed signals. 4,421,860., Cl. 436-518.000.
Elkem a/s: *See*—
Bjune, Arne; Boe, Gunnar H.; and Danielsen, Tore, 4,421,616., Cl. 204-115.000.
Ellard, James A.; and Webster, James A., to United States of America, Health and Human Services. Separation of triphenylphosphine oxide from methotrexate ester and purification of said ester. 4,421,913., Cl. 544-260.000.
Elleman, Daniel D.; Croonquist, Arvid P.; and Wang, Taylor G., to United States of America, National Aeronautics and Space Administration. Acoustic rotation control. 4,420,977., Cl. 73-505.000.
Ellis, David G.: *See*—
Schoenberg, Steve; and Ellis, David G., 4,421,800., Cl. 427-424.000.
Ellis, Norman, to Holset Engineering Company Limited. Housing for viscous fluid coupling device. 4,421,216., Cl. 192-58.00B.
Elmer, William B. Illuminating device with reflector portions and voids opposite thereof. 4,422,133., Cl. 362-277.000.
Elser, Dieter, to Zahnradfabrik Friedrichshafen, AG. Steering gear for motor vehicles. 4,421,010., Cl. 91-375.00R.
Elser, Dieter, to Zahnradfabrik Friedrichshafen, A.G. Power steering system for motor vehicles. 4,421,011., Cl. 91-380.000.
Embree, Louie G.; and Embree, Wayne W. Asphalt-oil heat transfer composition. 4,421,663., Cl. 252-74.000.
Embree, Wayne W.: *See*—
Embree, Louie G.; and Embree, Wayne W., 4,421,663., Cl. 252-74.000.
Emeigh, Roger D.: *See*—
Arter, Nelson K.; Bartholet, Michael A.; Emeigh, Roger D.; and Herman, Marion J., 4,421,264., Cl. 227-2.000.
Emerson Electric Co.: *See*—
Tuggle, Lloyd H.; and Loyd, Ronald C., 4,421,176., Cl. 172-41.000.
Emerson, Reginald S.; and Morris, Norman. Drive coupling. 4,421,496., Cl. 464-95.000.
Enchev, Encho M.: *See*—
Radomirov, Radomir V.; Kolev, Kolyo R.; Enchev, Encho M.; and Ivanov, Ivan N., 4,422,065., Cl. 340-347.00P.
Endevoets, Willy J. C.: *See*—
Bruninx-Poesen, Leonce M. J.; Drop, Peter C.; Kaldenhoven, Lambert C. I.; Lorenz, Roland; and Endevoets, Willy J. C., 4,422,011., Cl. 313-642.000.
Endo, Nobuaki: *See*—
Arai, Yoshio; Kataoka, Hiroyuki; and Endo, Nobuaki, 4,422,153., Cl. 364-525.000.
Energiagazdalkodasi Intezet: *See*—
Bodas, Janos; Papp, Istvan; Palfalvi, Gyorgy; and Vadas, Zoltan, 4,420,950., Cl. 62-402.000.
Engelhard Corporation: *See*—
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Engstrom Medical Aktiebolag: *See*—
Gedeon, Andras; Lundell, Ulf; and Pilenvik, Goran, 4,421,113., Cl. 128-204.230.
Enoshima, Toshio; Furuhashi, Shoji; and Tamura, Hideyuki, to Nissan Motor Company, Limited. Knock detector. 4,420,967., Cl. 73-35.000.
Epson Corporation: *See*—
Owatari, Akio, 4,421,559., Cl. 106-20.000.
Saito, Shizuo, 4,422,084., Cl. 346-140.00R.
Era Electronics (Canada) Limited: *See*—
Mandel, Max, 4,421,075., Cl. 123-142.50R.
Erbstoesser, Steven R.; and Graham, Robert L., to Exxon Production Research Co. Method of controlling displacement of propping agent in fracturing treatments. 4,421,167., Cl. 166-255.000.
Erco Industries Limited: *See*—
Reeve, Douglas W., 4,421,598., Cl. 162-88.000.
Twardowska, Helena, 4,421,728., Cl. 423-265.000.
Erdos, Adorjan: *See*—
Ghyczy, Miklos; Erdos, Adorjan; and Heidemann, Gunter, 4,421,747., Cl. 424-199.000.
Erkan, Gunduz; and Scott, George, to Interceram, Inc. Method of manufacturing a thyrister housing. 4,420,869., Cl. 29-460.000.
Escher Wyss Limited: *See*—
Heuss, Valentin; and Miller, Helmut, 4,421,990., Cl. 290-53.000.
Eskimo Pie Corporation: *See*—
Hocking, Paul R.; Straight, Jay G.; and Moore, Henry P., 4,421,019., Cl. 99-450.400.
ESPE Fabrik pharmazeutischer Praeparate GmbH: *See*—
Herold, Wolf-Dietrich, 4,421,987., Cl. 250-492.100.
Estabrook, Mark R.; and Marchman, James I., to Barnes Drill Co. Filter with indexable filter web. 4,421,647., Cl. 210-387.000.
Estel Hoesch Werke Aktiengesellschaft: *See*—
Grasshoff, Hans W., 4,420,960., Cl. 72-202.000.
Estes, Jeffery S. B.: *See*—
Estes, Roger Q.; and Estes, Jeffery S. B., 4,421,107., Cl. 128-20.000.
Estes, Roger Q.; and Estes, Jeffery S. B. Surgical retractor elements and assembly. 4,421,107., Cl. 128-20.000.
Ethyl Corporation: *See*—
Seemuth, Paul D., 4,421,522., Cl. 44-53.000.
Ethyl Products Company: *See*—
King, Roderick V., 4,420,959., Cl. 72-113.000.
Eulenberg, Thomas: *See*—
Eischen, Gaston; Eulenberg, Thomas; Gowert, Helmut; Grablowitz, Rainer; and Pernet, Michel, 4,421,541., Cl. 65-99.300.
Eulenburg, Ulrich: *See*—
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Euteco Impianti S.p.A.: *See*—
Invernizzi, Renzo; Ligorati, Ferdinando; Fontanesi, Maurizio; and Catenacci, Roberto, 4,421,674., Cl. 502-154.000.
Evans, Harold R.: *See*—
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Evans, Norol T.: *See*—
Williams, Barry E.; Evans, Norol T.; and Propster, John A., 4,422,074., Cl. 343-5.0CF.
Evans, Sherwood P.: *See*—
Kontis, George E.; and Evans, Sherwood P., 4,421,008., Cl. 89-33.0CA.
Extrude Hone Corporation: *See*—
Risko, Donald G., 4,422,035., Cl. 324-61.00P.
Exxon Production Research Co.: *See*—
Erbstoesser, Steven R.; and Graham, Robert L., 4,421,167., Cl. 166-255.000.
Exxon Research and Engineering Co.: *See*—
Bradley, John S., 4,421,862., Cl. 518-700.000.
Grenoble, Dane C.; and Weissman, Walter, 4,421,637., Cl. 208-120.000.
Hoffmann, James E.; and Subramanian, Kohur N., 4,421,552., Cl. 75-9.000.
Logie, James A.; and Wilson, Arthur G., 4,422,098., Cl. 358-256.000.
Lundberg, Robert D.; Thaler, Warren A.; and Agarwal, Pawan K., 4,421,882., Cl. 524-31.000.
Lundberg, Robert D.; and Thaler, Warren A., 4,421,898., Cl. 525-186.000.
Olavesen, Christopher, 4,421,634., Cl. 208-111.000.
Fabriani, Ugo: *See*—
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Fabrique Nationale Herstal: *See*—
Bourlet, Maurice V.; and Storder, Jean-Pierre H., 4,420,899., Cl. 42-70.00A.
Falconer, David G. Combination anti-friction bearing and force-generating mechanism. 4,421,207., Cl. 185-29.000.
Fanslow, Glenn E.: *See*—
Burkholder, Harvey R.; and Fanslow, Glenn E., 4,421,651., Cl. 210-672.000.
Far West Botanicals, Inc.: *See*—
Ritter, Alexander S.; and Lee, James A., 4,420,903., Cl. 47-81.000.
Farkas, Thomas P.; Burr, Gary D.; and Smith, Robert W., to Dynamic Controls Corporation. Cooling effect sensor. 4,420,965., Cl. 374-43.000.
Farmer, Digby M.: *See*—
Daniels, Michael J.; and Farmer, Digby M., 4,421,850., Cl. 435-41.000.
Farmitalia Carlo Erba S.p.A.: *See*—
Cassinelli, Giuseppe; Grein, Arpad; Merli, Sergio; and Rivola, Giovanni, 4,421,851., Cl. 435-78.000.
Farnham, Robert A., to Chevron Research Company. Method and apparatus for supporting radial reactor centerpipes to accommodate thermal cycling. 4,421,723., Cl. 422-218.000.
Farquhar, Robert L.; and Ball, David N., to Graviner, Limited. Fire and explosion and detection suppression. 4,421,984., Cl. 250-339.000.
Farrell, Roger A.: *See*—
Jorgensen, Robert A.; Farrell, Roger A.; and Gerhold, Bruce W., 4,420,929., Cl. 60-39.060.
Feder, Friedhelm R., to Wedco Inc. Heat treating of material in finely divided form. 4,421,703., Cl. 264-68.000.
Federmann, Helmut; and Bausch, Joachim, to Felten & Guilleaume Energietechnik GmbH. Fiber-reinforced drive shaft. 4,421,497., Cl. 464-181.000.
Feenstra, Johannes; Tuin, Hermanus N.; and Schrederhof, Antonie, to U.S. Philips Corporation. Method of manufacturing printing heads for ink jet printers. 4,421,706., Cl. 264-157.000.
Fehrer, Ernst. Apparatus for manufacturing a yarn. 4,420,928., Cl. 57-401.000.
Feil, Carol: *See*—
Munck, Lars; Gibbons, Gregory C.; and Feil, Carol, 4,421,772., Cl. 426-231.000.
Feinleib, Sidney. Mobile copier. 4,421,406., Cl. 355-84.000.
Fejer, Martin M.: *See*—
Byer, Robert L.; and Fejer, Martin M., 4,421,721., Cl. 422-109.000.
Felten & Guilleaume Energietechnik GmbH: *See*—
Federmann, Helmut; and Bausch, Joachim, 4,421,497., Cl. 464-181.000.
Ferralli, Michael W.; and Moulton, David R. Elliptically shaped transducer enclosure. 4,421,200., Cl. 181-144.000.
Ferris, Tom E. Auxiliary load-carrying apparatus. 4,421,331., Cl. 280-81.00R.
Ferro Manufacturing Corporation: *See*—
Pickles, Joseph, 4,420,906., Cl. 49-352.000.
Filocamo, Peter P.: *See*—
Boyer, Albert E.; Callahan, John T.; and Filocamo, Peter P., 4,421,265., Cl. 228-180.00R.
Finet, Philip J.: *See*—
Woythal, Robert T.; and Finet, Philip J., 4,421,443., Cl. 409-232.000.
Finike Italiana Marposs S.p.A.: *See*—
Possati, Mario; Golinelli, Guido; and Selleri, Narciso, 4,420,889., Cl. 33-178.00F.
Fink, Conrad F.: *See*—
Potter, Robert M.; Archuleta, Jacobo R.; and Fink, Conrad F., 4,421,982., Cl. 250-260.000.
Finkle, Louis J. Adjustable shock absorbing handlebar structure. 4,420,989., Cl. 74-551.200.
Finley, Joseph H.: *See*—
Parsons, Norman C.; and Finley, Joseph H., 4,421,695., Cl. 260-974.000.
Fiorucci, Louis C.; and Morgan, Michael J., to Olin Corporation. Nonsqueous purification of mixed nitrate heat transfer media. 4,421,662., Cl. 252-70.000.
Firestone Tire & Rubber Company, The: *See*—
Hamed, Gary R., 4,421,900., Cl. 525-218.000.
Fischer Gesellschaft M.B.H.: *See*—
Stephan, Walter, 4,420,893., Cl. 36-3.00R.
Fischer, Hermann, to M.A.N.-Roland Druckmaschinen Aktiengesellschaft. Multiple printing mode printing machine system. 4,421,027., Cl. 101-142.000.
Fischer & Porter Company: *See*—
Schmoock, Roy F., 4,420,982., Cl. 73-861.120.
Fischer, Werner K.; and Bosshard, Ernst, to Swiss Aluminum Ltd. Lower part of a fused salt electrolytic cell. 4,421,625., Cl. 204-243.00R.
Fisons Limited: *See*—
Wardell, George, 4,421,762., Cl. 424-283.000.
Fives-Cail Babcock: *See*—
Cosar, Paul, 4,421,563., Cl. 106-100.000.
Fladt, Carl S.: *See*—
Maike, Bruce R.; Fladt, Carl S.; and Lavely, Frank E., 4,421,478., Cl. 431-351.000.
Fleck, Franz, to ITT Industries, Inc. Brake control valve arrangement. 4,421,212., Cl. 188-152.000.
Fleishman, Leonard; and Lynch, Henry J., to Jinnings, Orin H., a part interest. Pile driver. 4,421,180., Cl. 173-124.000.
Fluid Power Research, Inc.: *See*—
Heskett, Don E., 4,421,652., Cl. 210-687.000.
Flutec Fluidtechnische Geraete GmbH: *See*—
Schoen, Otmar, 4,420,981., Cl. 73-756.000.
FMC Corporation: *See*—
Chiang, John S.; and Goldstein, David, 4,421,729., Cl. 423-430.000.
Parsons, Norman C.; and Finley, Joseph H., 4,421,695., Cl. 260-974.000.
Smith, Harry M.; and Williams, Raymond D., 4,421,936., Cl. 568-678.000.
Wittman, Leroy L.; and Jensen, Lyle B., 4,421,241., Cl. 212-186.000.
Fogle, Ozzie; and Back, Harry E., to Champion International Corporation. Method for measuring film thickness on wood panels using an IR analyzer. 4,421,983., Cl. 250-339.000.
Fohlen, George M.: *See*—
Varma, Indra K.; Fohlen, George M.; and Parker, John A., 4,421,820., Cl. 428-246.000.
Fontanesi, Maurizio: *See*—
Invernizzi, Renzo; Ligorati, Ferdinando; Fontanesi, Maurizio; and Catenacci, Roberto, 4,421,674., Cl. 502-154.000.
Ford Motor Company: *See*—
Rao, Vemulapalli D. N., 4,421,717., Cl. 419-27.000.
Wade, Wallace R., 4,421,079., Cl. 123-255.000.
Forthstar Limited: *See*—
Hough, George H., 4,421,981., Cl. 250-253.000.
Forys, Edward L., to McDonnell Douglas Corporation. Multiple axis actuator. 4,421,997., Cl. 310-12.000.
Foster Wheeler Energy Corporation: *See*—
Diggins, Joseph P., 4,421,069., Cl. 122-487.000.
Lambert, John S.; and Gleitsmann, Joseph W., deceased, 4,421,639., Cl. 208-309.000.
Fouassier, Claude; and Saubat, Bernadette, to Rhone Poulenc Industries. Luminescent substances having a base of double borate of magnesium and rare earths and low pressure mercury vapor lamp containing the same. 4,422,007., Cl. 313-486.000.
Foucher, Gerard; and Hermand, Michel, to Alsthom-Atlantique. Fixed fad thrust bearing. 4,421,425., Cl. 384-123.000.
Fox, Robert J.: *See*—
Creps, John L.; Fox, Robert J.; Guelde, Ted W.; Harms, Eugene H.; and McEwen, Stephen N., 4,421,645., Cl. 210-260.000.
Fox, Terry L.: *See*—
Dibrell, Edwin W., 4,420,945., Cl. 62-86.000.
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Hanley, William, 4,421,444., Cl. 413-4.000.
Frances, Andre: *See*—
Gentric, Alain; and Frances, Andre, 4,421,965., Cl. 200-175.000.
Franckowiak, Sigismond: *See*—
Dezael, Claude; and Franckowiak, Sigismond, 4,421,725., Cl. 423-228.000.
Frank, Xaver. Support leg for mobile conveyors. 4,421,290., Cl. 248-558.000.
Franke, George, to Simplex Time Recorder Co. Time recorder registration apparatus. 4,422,079., Cl. 346-1.100.
Franz, John E.; and Kaufman, Robert J., to Monsanto Company. Amido and hydrazido derivatives of N-trifluoroacetyl-N-phosphinothioylmethylglycine esters. 4,421,549., Cl. 71-87.000.
Frederick, Stanley H., to International Telephone and Telegraph Corporation. Swimming pool filtering system. 4,421,643., Cl. 210-138.000.

Frediani, John K.: *See*—
Couper, Robert A.; Frediani, John K.; and Lillie, Terrance L., 4,422,070., Cl. 340-723.000.
Fredriksen, Nils, to Claas OHG. Self-propelled multiple-purpose agricultural machine with displaceable driver's cabin. 4,421,188., Cl. 180-327.000.
Freermann, Johannes; and Malcherek, Dieter, to Carl Schmale KG. Automatic method and apparatus for feeding a textile piece to a sewing machine. 4,421,044., Cl. 112-262.300.
Frey, Ernest. Fluid level control apparatus. 4,421,459., Cl. 417-38.000.
Friauf, Walter S.; and Brooks, Rodney A., to United States of America, Health and Human Services. Nuclear pulse discriminator. 4,421,986., Cl. 250-369.000.
Frick, Adolf, to Stoechio-matic AG. Burner for the combustion of liquid fuels in the gaseous state. 4,421,475., Cl. 431-207.000.
Friemel, Wolfgang F. R.; and Praxl, Werner O., to Dr. Werner Freyberg Chemische Fabrik Delitia Nachf. Phosphine producing pesticide and method of manufacture therefor. 4,421,742., Cl. 424-128.000.
Frito-Lay, Inc.: *See*—
Baker, John E.; Topor, Michael G.; Ivers, John T.; and Stutz, H. Kent, 4,421,779., Cl. 426-660.000.
Fritz, Harald: *See*—
Dunemann, Klaus; and Fritz, Harald, 4,420,980., Cl. 73-730.000.
Frush, Don R.; and Coffman, Keith B., to Chore-Time Equipment, Inc. Nipple waterer. 4,421,060., Cl. 119-72.500.
Fuji Electric Co., Ltd.: *See*—
Nagasawa, Ikuo; and Ishii, Takashi, 4,422,122., Cl. 361-127.000.
Fuji Jukogyo Kabushiki Kaisha: *See*—
Makishima, Sadao; and Iwata, Seiichi, 4,421,335., Cl. 280-247.000.
Fuji Photo Film Co., Ltd.: *See*—
Inuiya, Masafumi, 4,422,097., Cl. 358-227.000.
Takeda, Keiji; Nirasawa, Mitsuharu; and Nagata, Masayoshi, 4,421,838., Cl. 430-58.000.
Fuji, Tsuneharu; Tsumura, Masakatsu; and Ishikawa, Takayoshi, to Matsushita Electric Industrial Co., Ltd. Band-pass filter having multilayered coil structures. 4,422,059., Cl. 333-202.000.
Fuji Xerox Co., Ltd.: *See*—
Arai, Yoshio; Kataoka, Hiroyuki; and Endo, Nobuaki, 4,422,153., Cl. 364-525.000.
Fujii, Hiroyuki; Shimakawa, Joji; Hara, Yukio; and Kobayashi, Masatoshi, to Kabushiki Kaisha Suwa Seikosha; and Matsushimakogyo Kabushiki Kaisha. Quartz crystal oscillator. 4,421,621., Cl. 204-192.00C.
Fujii, Kozo: *See*—
Umemura, Sumio; Fujii, Kozo; Nishihira, Keigo; Sawada, Hiroyuki; Tanaka, Shuji; Nakai, Mamoru; Yoshida, Hiroshi; and Kuroki, Yoshiaki, 4,421,925., Cl. 549-372.000.
Fujii, Tsuneo: *See*—
Hattori, Shuzo; Morita, Shinzo; and Fujii, Tsuneo, 4,421,842., Cl. 430-296.000.
Hattori, Shuzo; Morita, Shinzo; and Fujii, Tsuneo, 4,421,843., Cl. 430-322.000.
Fujikawa, Kenji: *See*—
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Fujimaki, Akira, to Zaidan Hojin Minsei Kagaku Kyokai. Substance effective for prevention or therapy of nephritis and method for preparation thereof. 4,421,683., Cl. 260-112.00R.
Fujimori, Yukio: *See*—
Shinohara, Tatsuo; Oguri, Yukihiro; Fujimori, Yukio; and Kondo, Hiroyuki, 4,421,756., Cl. 424-258.000.
Fujioka, Masanobu: *See*—
Mori, Hiromichi; Matsumoto, Jun; and Fujioka, Masanobu, 4,421,955., Cl. 179-18.0EA.
Fujishima, Tooru, to Hitachi, Ltd. Time base error correcting apparatus for video player. 4,422,104., Cl. 358-322.000.
Fujita, Naoya: *See*—
Sampei, Tohru; Fujita, Naoya; Higuchi, Shigemitsu; Yamada, Masamichi; and Tomatsuri, Kouichi, 4,422,108., Cl. 360-65.000.
Sampei, Tohru; Fujita, Naoya; Higuchi, Shigemitsu; Yamada, Masamichi; and Tomatsuri, Kohichi, 4,422,109., Cl. 360-65.000.
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Koto, Toshio; Murakami, Katsuhiko; and Fujitani, Yugo, 4,421,185., Cl. 177-25.000.
Fujitsu Fanuc Limited: *See*—
Inaba, Hajimu; Miyashita, Hideo; and Otsuka, Shoichi, 4,422,142., Cl. 364-200.000.
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Funatsu, Tsuneo, 4,420,874., Cl. 29-576.00W.
Monma, Hideo; Takahashi, Masayuki; and Ishiguro, Masato, 4,422,038., Cl. 324-73.00R.
Fujiwara, Tatsuro; Honda, Eiichi; Sakakibara, Hideo; and Hirano, Takao, to Toyo Jozo Kabushiki Kaisha. Deoxydesmycosin. 4,421,911., Cl. 536-7.100.
Fukuda, Kunio: *See*—
Kasahara, Hideo; Tazaki, Kichiya; Fukuda, Kunio; and Suzuki, Hiroshi, 4,421,892., Cl. 524-514.000.
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Fulkerson, Gregory M.: *See*—
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Funatsu, Tsuneo, to Fujitsu Limited. Method of producing an IIL semiconductor device utilizing self-aligned thickened oxide patterns. 4,420,874., Cl. 29-576.00W.
Furuhashi, Shoji: *See*—
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Furukawa Electric Co., Ltd., The: *See*—
Edahiro, Tadao; Yoshida, Kazuaki; Ogura, Kunio; Shibuya, Seiji; and Murata, Hiroshi, 4,421,539., Cl. 65-3.120.
Furuto, Yoshio; Meguro, Shinichiro; Suzuki, Takuya; Ito, Ikuo; Ando, Toshinari; Nishi, Masataka; and Shimamoto, Susumu, 4,421,946., Cl. 174-128.00S.
Nojiri, Akio; Sawasaki, Takashi; Noguchi, Isamu; Onobori, Shinji; and Sasazima, Junnosuke, 4,421,867., Cl. 521-82.000.
Furukawa, Kaoru: *See*—
Kakumoto, Hiromi; and Furukawa, Kaoru, 4,422,032., Cl. 320-39.000.
Furukawa, Yoshio, to Hitachi, Ltd. Thrust bearing device. 4,421,426., Cl. 384-219.000.
Furuto, Yoshio; Meguro, Shinichiro; Suzuki, Takuya; Ito, Ikuo; Ando, Toshinari; Nishi, Masataka; and Shimamoto, Susumu, to Furukawa Electric Co., Ltd., The; and Japan Atomic Energy Research Institute. High current capacity superconductor. 4,421,946., Cl. 174-128.00S.
Futamura, Yoshisumi; Komeiji, Shigeki; Noro, Shuhei; Hasegawa, Junzo; Matsunari, Fumio; and Ikeda, Toshiaki, to Toyota Jidosha Kogyo Kabushiki Kaisha; and Toyota Chuo Kenky usho Kabushiki Kaisha. Tripod type constant velocity universal joint. 4,421,494., Cl. 464-111.000.
G. L. Rexroth GmbH: *See*—
Mucheyer, Norbert; and Schulte, Heinz, 4,421,012., Cl. 91-388.000.
GA Technologies Inc.: *See*—
Norman, John H., 4,421,734., Cl. 423-648.00R.
Gaede, Hans: *See*—
Sewell, James H.; Gaede, Hans; and Ritch, Curtis R., 4,421,259., Cl. 223-76.000.
Gainutdinov, Garifulla K.: *See*—
Abishev, Dzhantore N.; Malyshev, Vitaly P.; Bauer, Ivan K.; Yarygin, Vladimir A.; Maisakov, Mikhail E.; Gainutdinov, Garifulla K.; Nazarov, Alexandr M.; Kusainov, Temirkhan A.; Burovoi, Isaak A.; and Omarov, Bulat N., 4,422,174., Cl. 373-115.000.
Gale, Anthony G.: *See*—
Wilkinson, Wilfred H.; Pateman, Edwin; Gale, Anthony G.; and Slinger, John, 4,421,153., Cl. 164-35.000.
Galie, Louis M., to System Development Corporation. Method and means for interrogating a layered data base. 4,422,158., Cl. 364-900.000.
Galle, Edward M., Jr., to Armco Inc. Weight-set pack-off unit. 4,421,164., Cl. 166-118.000.
Galli, Graziano: *See*—
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Gamon, Vicente: *See*—
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Gappa, Gunther: *See*—
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Garbacz, Michael, to Zenith Radio Corporation. Surface wave filter with reduced substrate size. 4,422,057., Cl. 333-194.000.
Garcea, Giampaolo; Banfi, Ambrogio; and Di Stefano, Michele L., to Alfa Romeo S.p.A. Automatic timing variator for an internal combustion engine. 4,421,074., Cl. 123-90.150.
Garcia, Guillermo E. Magnetically attachable timing gauge for a fuel injector. 4,420,973., Cl. 73-119.00A.
Garcia, Roger, Jr., to General Electric Company. Battery flow restrictor. 4,421,831., Cl. 429-70.000.
Garrett Corporation, The: *See*—
Tomren, Raymond H., 4,421,455., Cl. 415-119.000.
Gartner, Eckhard: *See*—
Reichardt, Manfred; Pieper, Christian; Nogaj, Alfred; Sandhu, Surinder S.; and Gartner, Eckhard, 4,421,708., Cl. 264-206.000.
Gartner, Robert; Maass, Klaus-Dieter; and Senninger, Georg, to Hoechst Aktiengesellschaft. Cylindrical vessel with a base ring and with a coupling device. 4,421,234., Cl. 206-509.000.
Gates Rubber Company, The: *See*—
Uba, Toshio, 4,421,832., Cl. 429-72.000.
Gault, Roger T.: *See*—
Schlapman, William J.; and Gault, Roger T., 4,421,177., Cl. 172-63.000.
Gausepohl, Hermann: *See*—
Echte, Adolf; Gausepohl, Hermann; and Gerberding, Karl, 4,421,895., Cl. 525-53.000.
Gay, Lucien: *See*—
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Gaynor, John C.: *See*—
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Gazzara, Peter: *See*—
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Gedeon, Andras; Lundell, Ulf; and Pilenvik, Goran, to Engstrom Medical Aktiebolag. Method and apparatus for controlling lung ventilators. 4,421,113., Cl. 128-204.230.
Gedye, Laurence R., to L.R. & N.R. Gedye Pty. Limited. Filter housing. 4,421,644., Cl. 210-233.000.
Geer, Marjorie. Compact case with interchangeable cosmetic inserts. 4,421,127., Cl. 132-83.00R.

Gehring, Heinz, to Maschinenfabrik Gehring Gesellschaft mit beschrankter Haftung & Co. Kommanditgesellschaft. Apparatus for holding workpieces during honing work. 4,420,912., Cl. 51-227.00R.
Gehrke, Willard H.: *See—*
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Gellatly, Grant, to Philip Morris Incorporated. Process for utilizing tobacco fines in making reconstituted tobacco. 4,421,126., Cl. 131-371.000.
General Dynamics Corporation, Electronics Division: *See—*
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General Electric Company: *See—*
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Bloomer, Milton D., 4,421,993., Cl. 307-126.000.
Briant, Jacqueline L.; and Asher, Jeffrey A., 4,422,129., Cl. 361-433.000.
Castleberry, Donald E., 4,420,896., Cl. 40-427.000.
Castleberry, Donald E., 4,420,897., Cl. 40-427.000.
Cooper, Glenn D.; Lee, Gim F., Jr.; and Shufelt, Rainey A., 4,421,883., Cl. 524-127.000.
Cusano, Dominic A.; Greskovich, Charles D.; and DiBianca, Frank A., 4,421,671., Cl. 252-301.40F.
Eckberg, Richard P.; and LaRochelle, Ronald W., 4,421,904., Cl. 528-27.000.
Garcia, Roger, Jr., 4,421,831., Cl. 429-70.000.
Hammer, Edward E., 4,422,010., Cl. 313-594.000.
Jorgensen, Robert A.; Farrell, Roger A.; and Gerhold, Bruce W., 4,420,929., Cl. 60-39.060.
Knecht, David C., 4,422,004., Cl. 313-25.000.
Kornrumpf, William P., 4,422,138., Cl. 363-21.000.
MacKenzie, Burton T., Jr.; and Rothenberg, Sidney, 4,421,890., Cl. 524-431.000.
Roberts, Victor D., 4,422,056., Cl. 333-177.000.
Schmidt, Lawrence R.; and Lovgren, Eric M., 4,421,907., Cl. 528-128.000.
Tolentino, Luisito A., 4,421,926., Cl. 556-471.000.
General Foods Corporation: *See—*
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General Motors Corporation: *See—*
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Holupko, Darrell, 4,421,414., Cl. 366-348.000.
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Newton, Ronald O., 4,421,360., Cl. 303-22.00A.
Genter, Claude: *See—*
Arnoux, Daniel; Leconte, Andre; Genter, Claude; and Michel, Bernard, 4,420,918., Cl. 52-157.000.
Gentric, Alain; and Frances, Andre. Commutator with several layers of cross-points. 4,421,965., Cl. 200-175.000.
Genzling, Claude; and Mathieu, Michel. Cyclists' gloves. 4,420,843., Cl. 2-161.00A.
George, David A.: *See—*
Massey, Lester G.; George, David A.; Brabets, Robert I.; and Abel, William A., 4,421,722., Cl. 422-129.000.
Georgia-Pacific Corporation: *See—*
Armstrong, A. Douglas; Bodenheimer, Vernon B.; and Rytter, Tom O., 4,421,597., Cl. 162-47.000.
Gerard, Francois; and Machat, Jean-Yves, to Compagnie Generale des Etablissements Michelin. Process for producing electrode with current outlets. 4,421,609., Cl. 204-16.000.
Gerard, Philippe: *See—*
Bianchin, Christian; Deneuville, Alain F.; and Gerard, Philippe, 4,421,677., Cl. 252-501.100.
Gerberding, Karl: *See—*
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Gerhold, Bruce W.: *See—*
Jorgensen, Robert A.; Farrell, Roger A.; and Gerhold, Bruce W., 4,420,929., Cl. 60-39.060.
Gerry, Martin E. Distributed inductive-capacitive high voltage ignition cable. 4,422,054., Cl. 333-12.000.
Geschwender, Mark J. Model flight simulator. 4,421,485., Cl. 434-32.000.
Geus, Marie-Luise: *See—*
Buhr, Gerhard; and Geus, Marie-Luise, 4,421,844., Cl. 430-326.000.
Gfeller, Fritz R., to International Business Machines Corporation. Bus arrangement for interconnecting circuit chips. 4,422,088., Cl. 357-19.000.
Ghyczy, Miklos; Erdos, Adorjan; and Heidemann, Gunter, to A. Nattermann & Cie. GmbH. Inflammation-preventing pharmaceutical composition of oral administration. 4,421,747., Cl. 424-199.000.
Gibbons, Gregory C.: *See—*
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Gilbert, David J.; and Hollingsbee, Derek A., to Smith and Nephew Associated Companies Limited. Pharmaceutical compositions. 4,421,741., Cl. 424-104.000.
Gilden, Meyer: *See—*
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Gilman, Thomas; and Miller, Frank N., to Kendall Company, The. Scrub brush. 4,420,853., Cl. 15-111.000.
Gilson, Robert E. Liquid handling apparatus. 4,422,151., Cl. 364-496.000.
Giskehaug, Karl J.; Loiten, Kjell O.; and Mejdell, Glor T., to Norsk Hydro a.s. Method and apparatus for enriching compounds of low water solubility from aqueous suspensions of substantially inorganic solid substances. 4,421,649., Cl. 210-634.000.
Givens, Edwin N.: *See—*
Roberts, George W.; Givens, Edwin N.; and Skinner, Ronald W., 4,421,630., Cl. 208-8.0LE.
Glacier Metal Company Limited, The: *See—*
Davies, Glyndwr J., 4,421,795., Cl. 427-385.500.
Glaenzer Spicer: *See—*
Orain, Michel A., 4,421,196., Cl. 180-257.000.
Glaser, David. Method and apparatus for obtaining a focusable beam of electrons from a gaseous hollow-cathode discharge. 4,422,014., Cl. 315-169.400.
Glaser, Roger M.: *See—*
Petrofsky, Jerrold S.; and Glaser, Roger M., 4,421,336., Cl. 280-252.000.
Glassman, Joel. Snap shoe. 4,420,894., Cl. 36-12.000.
Gleitsmann, Joseph W., deceased: *See—*
Lambert, John S.; and Gleitsmann, Joseph W., deceased, 4,421,639., Cl. 208-309.000.
Gleitsmann, Virginia E., executrix: *See—*
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Glimskar, Bo: *See—*
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Glori-Us Sportswear, Inc.: *See—*
Klausen, Jack H.; and Klausen, Glori J., 4,421,117., Cl. 128-555.000.
Godwin, Gurney L.; and Vance, Alvin M., to Westinghouse Electric Corp. Brushless excitation system with a holding current resistor. 4,422,028., Cl. 318-718.000.
Goldbach, Gary O.; and O'Hagan, Michael A., to Combustion Power Company, Inc. Method and apparatus for removing foreign objects from fluid bed systems. 4,421,038., Cl. 110-245.000.
Golden, Raymond, to Babcock & Wilcox Company, The. Insertion-withdrawal mechanism for rack mounted circuit boards. 4,421,372., Cl. 339-75.0MP.
Goldfarb, Adolph E. Coin clock. 4,421,415., Cl. 368-62.000.
Goldstein, David: *See—*
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Golinelli, Guido: *See—*
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Gomi, Kenichi: *See—*
Komuro, Takeo; Gomi, Kenichi; Arashi, Norio; Akimoto, Hidetoshi; Hishinuma, Yukio; Iinuma, Hajime; and Kanda, Osamu, 4,421,732., Cl. 423-569.000.
Goodridge, Francis; Montgomery, Anthony J.; and Wright, Alan R., to Bush Boake Allen. Preparation of hydroxy compounds by electrochemical reduction. 4,421,613., Cl. 204-74.000.
Gordbegli, Manochehr, to Teledyne Industries, Inc. High efficiency boiler. 4,421,066., Cl. 122-264.000.
Gore, Jacques: *See—*
Bluthe, Norbert; Gore, Jacques; and Malacria, Max, 4,421,934., Cl. 568-341.000.
Gormley, James J., to Imperial Chemical Industries PLC. Aminoacyl derivatives. 4,421,744., Cl. 424-177.000.
Gorondy, Emery J., to E.I. Du Pont de Nemours & Co. Printing process. 4,421,515., Cl. 8-444.000.
Gorondy, Emery J., to Du Pont de Nemours, E. I., and Company. Printing process. 4,421,517., Cl. 8-471.000.
Gorondy, Emery J., to Du Pont de Nemours, E. I., and Company. Printing process. 4,421,518., Cl. 8-471.000.
Gosselin, Robert G.: *See—*
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Goto, Takeshi; Soeda, Takashi; Asai, Nobuyoshi; and Tanaka, Akira, to Otsuka Chemical Co., Ltd. Aminosulfenyl chloride derivatives. 4,421,693., Cl. 260-464.000.
Gotomyo, Yasuo, to Toyo Kogyo Co., Ltd. Foot-operated, latch releasing mechanism for automobile doors. 4,421,350., Cl. 292-123.000.
Gottschalk, Bernard, to United States of America, Energy. Timing discriminator using leading-edge extrapolation. 4,421,995., Cl. 307-361.000.
Gowert, Helmut: *See—*
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Grafton, David A.; Hochberg, Eric B.; and Purkis, Ronald E., to United States of America, Army. Bi-directional fibre-optic coupler. 4,422,181., Cl. 455-606.000.
Graham, Arthur E., to International Business Machines Corporation. Resistive substrate for thermal printing ribbons comprising a mixture of thermosetting polyimide, thermoplastic polyimide, and conductive particulate material. 4,421,429., Cl. 400-120.000.
Graham, Boynton, to Du Pont de Nemours, E. I., and Company. Acrylic plastisols and organosols and photosensitive compositions and elements made therefrom. 4,421,619., Cl. 204-159.160.
Graham, Donald R.: *See—*
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Graham, Paul M.; and Krinski, Thomas L., to Ralston Purina Company. Heat coagulable paper coating composition with a soy protein adhesive binder. 4,421,564., Cl. 106-154.00R.
Graham, Robert L.: *See—*
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Granger, Donald W.: *See—*
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Granzow, Robert H.: *See—*
Gupta, Desh B.; and Granzow, Robert H., 4,421,824., Cl. 428-211.000.
Grasshoff, Hans W., to Estel Hoesch Werke Aktiengesellschaft. Arrangement for hot-rolling of metal workpieces. 4,420,960., Cl. 72-202.000.
Gratton, Richard A. Apparatus for applying refractory material to refractory lined vessels. 4,421,275., Cl. 239-226.000.
Gratzel, Michael; and Kiwi, John, to Engelhard Corporation. Photolytic production of hydrogen from water. 4,421,617., Cl. 204-157.10R.
Graue, William D.; and Oros, Leo J. Gas diffuser. 4,421,696., Cl. 261-123.000.
Gravemann, Horst, to Kabel und Metallwerke Gutehoffnungshutte AG. Making molds for continuous casting. 4,421,570., Cl. 148-11.50C.
Graviner, Limited: *See—*
Farquhar, Robert L.; and Ball, David N., 4,421,984., Cl. 250-339.000.
Grayson, James I.; and Dinkel, Rolf, to Lonza Ltd. Process for the production of 3-picoline. 4,421,921., Cl. 546-251.000.
Greber, Jorg F.; and Winkhaus, Gunter, to Vereinigte Aluminium-Werke Aktiengesellschaft. Resinous compositions containing modified alumina hydrate crystals. 4,421,876., Cl. 523-402.000.
Greding, Robert; and Bryce, Rodney H., to Canadian General Electric Company Limited. Slitter indexing system. 4,420,996., Cl. 83-13.000.
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Greiert, Alfred H., Jr., to Boeing Company, The. Cowling latch. 4,421,349., Cl. 292-19.000.
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Grenoble, Dane C.; and Weissman, Walter, to Exxon Research and Engineering Co. Catalytic cracking process with simultaneous production of a low BTU fuel gas and catalyst regeneration. 4,421,637., Cl. 208-120.000.
Greskovich, Charles D.: *See—*
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Grimm, William G.; and Pott, Ronald W. Prefabricated adjustable handrail assembly. 4,421,302., Cl. 256-67.000.
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Gross, David R., to J. M. Smucker Company, The. Apparatus for the concentration of fruits. 4,421,020., Cl. 99-472.000.
Grossman, William M.: *See—*
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Gruber, Werner; and Bruhn, Hans-Athanas, to Henkel Kommanditgesellschaft auf Aktien. Cyanacrylic acid ester based glues with a content of a diester of a polyoxyalkylene glycol. 4,421,909., Cl. 528-362.000.
Grumet, Alex; Wolf, Abe; and Calderone, Gaspar J., to Grumman Aerospace Corporation. Multiple holographic lens. 4,421,379., Cl. 350-3.720.
Grumman Aerospace Corporation: *See—*
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GTE Products Corporation: *See—*
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Gubbe, Bernd; Krause, Klaus-Dieter; Schonemann, Otto; and Neidhardt, Rudolf, to Triumph-Adler A.G. fur Buro-und Informationstechnik. Apparatus for locking a keyboard at selected inclinations to a horizontal reference. 4,421,035., Cl. 108-6.000.
Gudgel, Howard S.; and Guier, William E., to Zena Equipment, Inc. Elevator transfer and support system. 4,421,447., Cl. 414-22.000.
Guelde, Ted W.: *See—*
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Guenther, Kenneth L.; Zemke, Edward H.; and Warden, Gerald D., to Bell & Howell Company. Label feeder for fan folded documents. 4,421,587., Cl. 156-256.000.
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Gulden, Peter; Michel, Alfred; and Kostka, Hana, to Siemens Aktiengesellschaft. Gasification burner. 4,421,476., Cl. 431-243.000.
Gulf Research & Development Company: *See—*
Beuther, Harold; and Schulz, Johan G., 4,420,930., Cl. 60-39.461.
Gulf & Western Industries, Inc.: *See—*
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Gunter, John B.; Quinn, George J.; Shields, Edward P.; Thomas, Burton S.; and Winkler, Clifford J., to Westinghouse Electric Corp. Baffle maintenance apparatus. 4,421,715., Cl. 376-245.000.
Gupta, Desh B.; and Granzow, Robert H., to NCR Corporation. Process for reconditioning of currency and currency. 4,421,824., Cl. 428-211.000.
Gurries, Raymond A., to Resonant Technology Company. Impact rail forger. 4,420,963., Cl. 72-407.000.
Gutekunst, Ferdinand; Lehmann, Hans; and Schmid, Rolf, to Ciba-Geigy Corporation. One component systems based on crystalline epoxide resins. 4,421,897., Cl. 525-119.000.
Guterman, Daniel C., to Texas Instruments Incorporated. High coupling ratio electrically programmable ROM. 4,422,092., Cl. 357-41.000.
Guttag, Karl M., to Texas Instruments Incorporated. Microprocessor ALU with absolute value function. 4,422,143., Cl. 364-200.000.
Haber, Edgar; and Khaw, Bao A., to Massachusetts General Hospital, The. Radiolabeled diagnostic compositions and method for making the same. 4,421,735., Cl. 424-1.100.
Haberkorn, Herbert: *See—*
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Hagin, Faust, to M.A.N. Maschinenfabrik Augsburg Nurnberg Aktiengesellschaft. Articulated vehicle, particularly a bus. 4,421,339., Cl. 280-460.00R.
Haicour, Philippe: *See—*
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Haight, Robert E., to Deere & Company. Relief valve means for rotatable fluid-pressure mechanisms. 4,421,218., Cl. 192-106.00F.
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Halewijn, Harry J., to Itek Corporation. Bi-directional clutchless film transport device. 4,421,263., Cl. 226-143.000.
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Nickles, R. Benton, 4,421,139., Cl. 138-89.000.
Szarka, David D., 4,421,165., Cl. 166-151.000.
Hallstrom, Stig; and Horman, Lars, to Aktiebolaget Bofors. Method and a device for cast-loading explosive charges. 4,421,004., Cl. 86-20.00D.
Haluska, Loren A.; and Molzahn, Marcelle G., to Dow Corning Corporation. Tintable, dyeable, curable coatings and coated articles. 4,421,893., Cl. 524-588.000.
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Hamano, Sachiyuki; Kitamura, Shinichi; Igarashi, Toshiji; and Nakajima, Yoshikage, to Eisai Co., Ltd. Cyclohexane derivatives, process for preparation thereof and medicines containing these cyclohexane derivatives. 4,421,763., Cl. 424-285.000.
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Hamed, Gary R., to Firestone Tire & Rubber Company, The. Blends of natural and synthetic rubbers. 4,421,900., Cl. 525-218.000.

Hammer, Edward E., to General Electric Company. Shaped discharge lamp with starting aid. 4,422,010., Cl. 313-594.000.
Hammerle, Frederick A., to TRW Inc. Two-part panel fastener. 4,420,859., Cl. 24-585.000.
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Hanakata, Takayoshi: *See*—
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Hanes, Norris H., Jr. Air bomb system. 4,421,007., Cl. 89-1.00A.
Hanke, Charles R., to Boeing Company, The. Wind shear responsive turbulence compensated aircraft throttle control system. 4,422,147., Cl. 364-440.000.
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Hanley, William, to Fram Corporation. Method of attaching closure member to filter housing. 4,421,444., Cl. 413-4.000.
Hansen, James L. Aeration fan mounting system. 4,421,013., Cl. 98-55.000.
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Harringer, Robert V., to Western Electric Company, Inc. Device for opening snap-locked housing sections of a cable connector. 4,420,879., Cl. 29-764.000.
Harshman, Ronald W.; and Dietrich, Lynn A., to Walter Kidde & Company, Inc. Hydraulic selector valve having joy stick control. 4,421,135., Cl. 137-312.000.
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Hasuly, Michael J.; Solarek, Daniel B.; and Jarowenko, Wadym, to National Starch And Chemical Corporation. Warp size. 4,421,566., Cl. 106-213.000.
Hatakeyama, Yoshiharu; and Kimura, Susumu, to Yoshida Industry Co., Ltd. Method and apparatus for attaching sealing piece onto pour-out hole of plastic closure cap or container. 4,421,705., Cl. 264-153.000.
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Hattori, Shuzo; Morita, Shinzo; and Fujii, Tsuneo, to Daikin Kogyo Co., Ltd. Process for forming film of fluoroalkyl acrylate polymer on substrate and process for preparing patterned resist from the film. 4,421,843., Cl. 430-322.000.
Hauck, Frederick A.: *See*—
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Hauser, Hans, to MTD Products Inc. Transmission filler. 4,420,990., Cl. 74-606.00R.
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Hayashi, Tsutomu; Kato, Masaie; and Saito, Mitsuru, to Honda Giken Kogyo Kabushiki Kaisha. Vehicular anti-lock brake device. 4,421,359., Cl. 303-6.00A.
Hayes, William V., to Dow Chemical Company, The. Preparation of nitroalkanes. 4,421,940., Cl. 568-948.000.
Haygood, Jerry, to Reed Tubular Products Co. Method for rethreading tubular members. 4,420,865., Cl. 29-402.190.
Haynes, Andrew, to Baker International Corporation. Valve operable under oppositely directed pressure differentials. 4,421,171., Cl. 166-331.000.
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Hector, Roger D.; and Jenkins, Harry H., Jr., to Atari, Inc. Electronic game apparatus using a three-dimensional image. 4,421,317., Cl. 273-313.000.
Heddon, Will. Modular bowling lane system. 4,421,309., Cl. 273-51.000.
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Heinz, Theodore A., to Rockwell International Corporation. Recirculating ball disc actuator. 4,420,987., Cl. 74-99.00A.
Heitzman, Charles J., to Auto-Cast International, Ltd. Apparatus for molding concrete articles and the like. 4,421,466., Cl. 425-125.000.
Helft, John M.; and Noyes, Walter O. Intrusion alarm system for preventing actual confrontation with an intruder. 4,422,068., Cl. 340-514.000.
Helle, Michel; and Desserre, Jacques, to Compagnie Internationale pour l'Informatique. Integrated magnetic transducer. 4,422,118., Cl. 360-126.000.
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Hempel, Hans-Ulrich; and Schmadel, Edmund, to Henkel Kommanditgesellschaft auf Aktien. Powdery antifoaming compositions for aqueous systems, their preparation and use. 4,421,666., Cl. 252-140.000.
Hench, John E.; and Fukushima, Tom Y., to S. Levy, Inc. Safety monitoring and reactor transient interpreter. 4,421,716., Cl. 376-216.000.
Henderson, John G. N., to RCA Corporation. Television frequency synthesizer for nonstandard frequency carriers. 4,422,096., Cl. 358-191.100.
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Hermand, Michel: *See*—
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Herold, Wolf-Dietrich, to ESPE Fabrik pharmazeutischer Praeparate GmbH. Apparatus for irradiating dental objects. 4,421,987., Cl. 250-492.100.
Herrington, Fox J., to Mobil Oil Corporation. Apparatus providing uniform resin distribution in a coextruded product. 4,421,465., Cl. 425-133.100.
Herrmann, Berthold: *See*—
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Heskett, Don E., to Fluid Power Research, Inc. Fluid treating method. 4,421,652., Cl. 210-687.000.
Hess, Hans-Peter, to Metallwerk Max Brose GmbH & Co. Window cable driving mechanism. 4,421,299., Cl. 254-342.000.
Hesseberg, Helmut: *See*—
Rudolf, Karl; and Hesseberg, Helmut, 4,421,032., Cl. 102-307.000.
Hesterlee, Jerry M., to Southwire Company. Apparatus for controlled temperature accumulator for elongated materials. 4,421,304., Cl. 266-103.000.
Hetman, Thomas, Jr., to Libbey-Owens-Ford Company. Material handling apparatus. 4,421,225., Cl. 198-345.000.
Heuss, Valentin; and Miller, Helmut, to Escher Wyss Limited. Tidal power plant and method of operating the same. 4,421,990., Cl. 290-53.000.
Hewitt, Michael J. Cored plastics profiles and manufacture of frames for windows and the like therefrom. 4,420,920., Cl. 52-309.150.
Hewlett-Packard Company: *See*—
Reynolds, Robert S., 4,422,110., Cl. 360-69.000.
Hibbard, Ray W.; and Hines, Randal C., to Nuclear Systems, Inc. Smart switch. 4,421,992., Cl. 307-41.000.
Hibi, Toru: *See*—
Nagai, Shigeki; Yorie, Takashi; Sugiura, Hisao; Hibi, Toru; Sato, Katsumi; Wada, Takuo; and Miyahara, Masahiko, 4,421,761., Cl. 424-275.000.
Hicks, Douglas C.; and Pleass, Charles M., to University of Delaware. Wave-powered desalination of seawater. 4,421,461., Cl. 417-53.000.
Hidaka, Hiroyoshi; Matsumoto, Ikuo; Yoshizawa, Junji; and Kotani, Shigenori, to Hidaka, Hiroyoshi. Syndonimine derivatives, process for production thereof, and use thereof. 4,421,754., Cl. 424-250.000.
Hieronymi, Gabriel C.; and Hansen, Randall C., to Abex Corporation. Flush mountable door latch mechanism. 4,420,954., Cl. 70-150.000.
Higgins, Bobby L., to Thermwood Corporation. Workpiece gripping mechanism for industrial robots. 4,421,451., Cl. 414-739.000.
Higuchi, Shigemitsu: *See*—
Sampei, Tohru; Fujita, Naoya; Higuchi, Shigemitsu; Yamada, Masamichi; and Tomatsuri, Kouichi, 4,422,108., Cl. 360-65.000.
Sampei, Tohru; Fujita, Naoya; Higuchi, Shigemitsu; Yamada, Masamichi; and Tomatsuri, Kohichi, 4,422,109., Cl. 360-65.000.
Hill, Walter A.; Stevenson, Andrew C.; and McKenna, Peter G., to Canadian General Electric Company Limited. Speed control for truck. 4,422,022., Cl. 318-376.000.
Hinchcliffe, Dennis: *See*—
Molins, Desmond W.; Hinchcliffe, Dennis; and Clarke, Peter A., 4,421,223., Cl. 198-604.000.
Hines, Randal C.: *See*—
Hibbard, Ray W.; and Hines, Randal C., 4,421,992., Cl. 307-41.000.
Hirakawa, Tadashi; Kusubayashi, Toshiaki; and Oku, Yukio, to Mitsubishi Jukogyo Kabushiki Kaisha. Rotary plate-shape material cutting arrangement. 4,420,999., Cl. 83-345.000.
Hirano, Reiji: *See*—
Matsumura, Isao; Ishikawa, Yasuyuki; Hirano, Reiji; Maruyama, Shigeo; and Kohayakawa, Yoshimi, 4,421,391., Cl. 351-211.000.
Hirano, Takao: *See*—
Fujiwara, Tatsuro; Honda, Eiichi; Sakakibara, Hideo; and Hirano, Takao, 4,421,911., Cl. 536-7.100.
Hirata, Yasushi: *See*—
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Hirayama, Yutaka: *See*—
Kajitani, Ikuo; Hayashi, Tadayoshi; Arai, Sakuji; and Hirayama, Yutaka, 4,420,933., Cl. 60-302.000.
Hirose, Noboru, to Brother Kogyo Kabushiki Kaisha. Cyclic drilling machine. 4,421,441., Cl. 408-17.000.
Hiroshi, Yasuba; Masahiro, Umeda; and Osamu, Yuri, to Matsushita Electric Industrial Co., Ltd. Method of improving image sharpness of an electrophotographic photosensitive plate. 4,421,837., Cl. 430-31.000.
Hirota, Hajime; and Watanabe, Hiroshi, to Kao Soap Co., Ltd. Liquid detergent composition comprising ammonium alkyl sulfate, polyoxyalkylene alkyl ether and fatty acid dialkanolamide. 4,421,681., Cl. 252-541.000.
Hirth, Emil: *See*—
Pietschmann, Helmut; Schmidt, Manfred; and Hirth, Emil, 4,421,483., Cl. 433-77.000.
Hishinuma, Yukio: *See*—
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Furukawa, Yoshio, 4,421,426., Cl. 384-219.000.
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Komuro, Takeo; Gomi, Kenichi; Arashi, Norio; Akimoto, Hidetoshi; Hishinuma, Yukio; Iinuma, Hajime; and Kanda, Osamu, 4,421,732., Cl. 423-569.000.
Kuroiwa, Hiroshi; and Oyama, Yoshishige, 4,420,972., Cl. 73-118.000.
Sampei, Tohru; Fujita, Naoya; Higuchi, Shigemitsu; Yamada, Masamichi; and Tomatsuri, Kouichi, 4,422,108., Cl. 360-65.000.
Sampei, Tohru; Fujita, Naoya; Higuchi, Shigemitsu; Yamada, Masamichi; and Tomatsuri, Kohichi, 4,422,109., Cl. 360-65.000.
Yamada, Jun; and Hazama, Katashi, 4,422,000., Cl. 310-313.00D.
Yoshinaga, Yoichi; Kobayashi, Hiromi; Ueda, Shinjiro; Takada, Yoshihiro; and Nishida, Hideo, 4,421,457., Cl. 415-211.000.
Hitachi Metals, Ltd.: *See*—
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Hocking, Paul R.; Straight, Jay G.; and Moore, Henry P., to Eskimo Pie Corporation. Cookie dispensing apparatus. 4,421,019., Cl. 99-450.400.
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Gartner, Robert; Maass, Klaus-Dieter; and Senninger, Georg, 4,421,234., Cl. 206-509.000.
Lang, Hans-Jochen; Seuring, Bernhard; and Granzer, Ernold, 4,421,757., Cl. 424-270.000.
Hoehn, Ernst; McKay, Curtis J.; and Murray, E. Donald. Production of high fructose syrup from inulin involving ultrafiltration. 4,421,852., Cl. 435-99.000.
Hoff, Herbert L.; and Leaver, Daniel C., to Trane Company, The. Centrifugal oil pump. 4,421,453., Cl. 415-88.000.
Hoffman, Fred W.; and Barrios, Raphael A., to Bendix Corporation, The. Connection mechanism for automatic slack adjuster. 4,421,211., Cl. 188-79.50K.
Hoffmann, James A.: *See*—
Chance, Ronald E.; and Hoffmann, James A., 4,421,685., Cl. 260-112.700.
Hoffmann, James E.; and Subramanian, Kobur N., to Exxon Research and Engineering Co. Dead roast-oxide flash reduction process for copper concentrates. 4,421,552., Cl. 75-9.000.
Hoffmann-La Roche Inc.: *See*—
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Partridge, John J.; Shiuey, Shian-Jan; and Uskokovic, Milan R., 4,421,690., Cl. 260-397.100.
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Hofmann, Peter; and Muller, Wolfgang H. E., to Chemische Werke Huls AG. Process for producing carboxylic acid alkylester after products extensively free from nitrogenated compounds. 4,421,692., Cl. 260-410.90R.
Hofmann, Peter: *See*—
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Hogberg, Ebbe T., to Billerud Uddeholm Aktiebolag. Method relating to dissolving molten smelt. 4,421,596., Cl. 162-30.110.
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Hogstrom, Per A. W.: *See*—
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Hokko Chemical Industry Co., Ltd.: *See*—
Ishikawa, Hiromichi; Kitaori, Kazuhiko; Kaneko, Kimiyoshi; Moriyama, Satoru; Kobayashi, Takashi; and Uchiyama, Tsugio, 4,421,750., Cl. 424-207.000.
Nagai, Shigeki; Yorie, Takashi; Sugiura, Hisao; Hibi, Toru; Sato, Katsumi; Wada, Takuo; and Miyahara, Masahiko, 4,421,761., Cl. 424-275.000.
Holbrook, Franklin K., to Brown International Corporation. Citrus juice extractor having means for separating juice pulp and rag from peel. 4,421,021., Cl. 99-504.000.
Hold, Peter; Tadmor, Zehev; and Valsamis, Lefteris N., to USM Corporation. Process and apparatus for processing plastic and polymeric materials. 4,421,412., Cl. 366-76.000.
Hollars, Dennis R., to Advanced Coating Technology, Inc. Method of making sputtered coatings. 4,421,622., Cl. 204-192.00P.
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Hollister Incorporated: *See*—
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Ellis, Norman, 4,421,216., Cl. 192-58.00B.
Holtz, R. Barry, to Spawn Mate, Inc. Nutrient for mushroom growth process for producing same. 4,421,543., Cl. 71-5.000.
Holupko, Darrell, to General Signal Corporation. High efficiency mixing method. 4,421,414., Cl. 366-348.000.
Holz, Peter; Patalon, Heinrich; and Hartkopf, Edgar, to Didier Engineering GmbH. Furnace for heating slabs, billets, rough castings and the like. 4,421,481., Cl. 432-239.000.
Honda, Eiichi: *See*—
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Isono, Tokio; and Tanaka, Osami, 4,421,338., Cl. 280-279.000.
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Lieb, M. Jeremy, 4,421,432., Cl. 400-492.000.
Nerheim, Eldon, 4,422,075., Cl. 343-6.00R.
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Horie, Shigeru; Asano, Takamasa; Ichihashi, Tetsuo; and Katoh, Hideo, to Teijin, Limited. Biaxially oriented polyester films. 4,421,887., Cl. 524-317.000.
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Horodysky, Andrew G.; and Kaminski, Joan M., to Mobil Oil Corporation. Zwitterionic quaternary ammonium sulfates and lubricants containing same. 4,421,659., Cl. 252-33.000.
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Horsma, David A.; and Dinz, Stephen H., to Raychem Corporation. Self-heating article with deformable electrodes. 4,421,582., Cl. 156-86.000.
Horyu, Sakae, to Canon Kabushiki Kaisha. Communication device having coupling means. 4,421,950., Cl. 179-2.0DP.
Hosono, Nagao; Kinoshita, Koichi; and Takahashi, Toru, to Canon Kabushiki Kaisha. Developing apparatus for electrostatic image. 4,421,057., Cl. 118-657.000.
Hosoya, Nobukazu, to Sanyo Electric Co., Ltd. Video tone control circuit. 4,422,095., Cl. 358-166.000.
Hostetler, Ronald E., to Crown Zellerbach Corporation. Tri-nip papermaking system. 4,421,600., Cl. 162-111.000.
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Kawakami, Yoshio; Okamura, Masatoshi; Shiba, Haruo; and Hotsuki, Hideki, 4,422,119., Cl. 360-128.000.
Hough, George H., to Forthstar Limited. Method and apparatus for conducting remote surveys of the earth's crust. 4,421,981., Cl. 250-253.000.
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Hoy, Robert W., to Peabody ABC Corporation. Sound attenuator. 4,421,202., Cl. 181-252.000.
Hoyrup, S. Johannes; and Krause, Karl A., to Kliklok Corporation. Apparatus and method for inverting and applying flanged lids to erected cartons. 4,420,924., Cl. 53-307.000.
Hoyt, Richard E., to Omco, Inc. Bolt type lock puller. 4,420,864., Cl. 29-263.000.
HPM Corporation: *See*—
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Huang, Yueh. Umbrella. 4,421,133., Cl. 135-22.000.
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Hudson Engineering Company: *See*—
Napolitano, Pellegrino E., 4,421,325., Cl. 277-27.000.
Huffman, Robert R., to C T Manufacturing, Inc. Centrifugal pump assembly. 4,421,456., Cl. 415-170.00A.
Hughes Aircraft Company: *See*—
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Huhta-Koivisto, Eako, to Oy Finn-Aqua Ltd. Distillation apparatus utilizing thermocompressor principles. 4,421,605., Cl. 202-181.000.
Huibers, Derk T. A., to Hydrocarbon Research, Inc. Process for making L-sugars and D-fructose. 4,421,568., Cl. 127-48.000.
Hunnel, Larry B., to Anglo Mineral Resources, Inc. Extraction method for refractory precious metal ore. 4,421,724., Cl. 423-22.000.
Hunsucker, Jerry H.; and Woods, Milton E., to International Minerals & Chemical Corp. Aminoplast resin crosslinking agents and nitroalkanol used to treat cellulose. 4,421,880., Cl. 524-14.000.
Hunter Douglas International N.V.: *See*—
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Hurd, Billy G., to Mobil Oil Corporation. Surfactant waterflooding with graded salinity drive for oil recovery. 4,421,168., Cl. 166-273.000.
Hurner, Erwin E. Oil changing system. 4,421,078., Cl. 123-196.00R.
Husky Systems of Georgia, Inc.: *See*—
Vargo, William R., 4,421,239., Cl. 211-187.000.
Huusari, Erkki, to Yhtyneet Paperitehtaat oy Jylhavaara. Process for preparing thermomechanical pulp with heat recovery. 4,421,595., Cl. 162-23.000.
Hydrocarbon Research, Inc.: *See*—
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Hypertherm, Incorporated: *See*—
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Horie, Shigeru; Asano, Takamasa; Ichihashi, Tetsuo; and Katoh, Hideo, 4,421,887., Cl. 524-317.000.
Ichiyanagi, Toshikazu, to Canon Kabushiki Kaisha. Automatic focusing system with interchangeable lens. 4,421,397., Cl. 354-400.000.
Ida, Edward S., to Du Pont de Nemours, E. I., and Company. Photometric analyzer. 4,421,411., Cl. 356-418.000.
Ideal Toy Corporation: *See*—
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Ikeuchi, Satoru; Kanbe, Masaru; Takahashi, Jiro; Kobayashi, Ryuichiro; Suginaka, Shunji; and Mizukura, Noboru, to Konishiroku Photo Industry Co., Ltd. Photographic element with reducible metal complex that releases photographically useful compound. 4,421,846., Cl. 430-559.000.
Ikezawa, Hideo; Takahashi, Yoshiyuki; and Hashimoto, Hideaki, to Oji Paper Co., Ltd. Pressure-sensitive record color-developing sheet. 4,421,344., Cl. 282-27.500.
Ikezawa, Kenji; Takao, Hiroshi; Aoki, Hiroyuki; and Kimura, Shinji, to Nissan Motor Company, Limited. Process for forming a thin dense sintered layer. 4,421,787., Cl. 427-126.200.
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Andrew, Sydney P. S., 4,421,303., Cl. 261-109.000.
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Inaba, Hajimu; Miyashita, Hideo; and Otsuka, Shoichi, to Fujitsu Fanuc Limited. System for controlling a plurality of microprocessors. 4,422,142., Cl. 364-200.000.
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Binnig, Gerd; Nievergelt, Hermann; Rohrer, Heinrich; and Weibel, Edmund, 4,422,002., Cl. 310-328.000.
Conly, Douglas J., 4,421,404., Cl. 355-14.0CU.
Gfeller, Fritz R., 4,422,088., Cl. 357-19.000.
Graham, Arthur E., 4,421,429., Cl. 400-120.000.
Johnson, Lance H.; Kiselak, John A., II; Nadarzynski, Edward A.; and Pedersen, Raymond J., 4,422,144., Cl. 364-200.000.
Laurer, George J.; and Stokes, Olen L., Jr., 4,421,978., Cl. 235-462.000.
McBride, Donald G., 4,421,608., Cl. 204-12.000.
Puri, Yogi K.; and Selbo, Keith M. A., 4,421,994., Cl. 307-200.00B.
Raider, Jerry W.; and Ward, Earl D., II, 4,422,040., Cl. 324-158.0MG.
Sacco, Giovanni M.; and Schkolnick, Mario, 4,422,145., Cl. 364-300.000.
Thorne, William D.; and Patterson, William A., 4,421,025., Cl. 101-93.040.
Titcomb, Stanley C., 4,422,080., Cl. 346-1.100.
Wolfe, Larry L., 4,422,099., Cl. 358-293.000.
International Coal Refining Company: *See—*
Roberts, George W.; Givens, Edwin N.; and Skinner, Ronald W., 4,421,630., Cl. 208-8.0LE.
International Flavors & Fragrances Inc.: *See—*
Boden, Richard M., 4,421,125., Cl. 131-276.000.
Boden, Richard M.; Dekker, Lambert; Schmitt, Frederick L.; and Van Loveren, Augustinus G., 4,421,679., Cl. 252-522.00R.
International Harvester Co.: *See—*
Bellah, Glen R.; Sobol, Lawrence M.; Idelman, Lloyd B.; and Thanh, Vo V., 4,421,215., Cl. 192-4.00A.
International Minerals & Chemical Corp.: *See—*
Hunsucker, Jerry H.; and Woods, Milton E., 4,421,880., Cl. 524-14.000.
Seeney, Charles E.; Kraemer, John F.; and Varnum, Nancy C., 4,421,873., Cl. 523-145.000.
Sundelin, Kurt G. R., 4,421,751., Cl. 424-245.000.
International Standard Electric Corporation: *See—*
Joswig, Siegfried; Liebscher, Johannes; Keils, Peter; and Tiwi, Peter, 4,420,904., Cl. 47-81.000.
International Telephone and Telegraph Corporation: *See—*
Frederick, Stanley H., 4,421,643., Cl. 210-138.000.
Interox (Societe Anonyme): *See—*
Brichard, Jean, 4,421,669., Cl. 252-186.250.
Inuiya, Masafumi, to Fuji Photo Film Co., Ltd. Automatic focus controlling method. 4,422,097., Cl. 358-227.000.
Invernizzi, Renzo; Ligorati, Ferdinando; Fontanesi, Maurizio; and Catenacci, Roberto, to Euteco Impianti S.p.A. Supported catalysts for the polymerization of ethylene. 4,421,674., Cl. 502-154.000.
Iowa State University Research Foundation, Inc.: *See—*
Burkholder, Harvey R.; and Fanslow, Glenn E., 4,421,651., Cl. 210-672.000.
Irie, Toshio; Kato, Toshiyuki; and Takahashi, Isao, to Kawasaki Steel Corporation. Method for producing hot-rolled dual-phase high-tensile steel sheets. 4,421,573., Cl. 148-12.00F.
Isa, Isao; Yamamoto, Hideo; Shindo, Syuki; and Shibuya, Morioki, to Japan Carlit Co., Ltd., The. Process for manufacturing highly pure chlorine dioxide. 4,421,730., Cl. 423-478.000.
Isgur, Irving E.: *See—*
Ohlson, John L.; and Isgur, Irving E., 4,421,826., Cl. 428-394.000.
Ishiguro, Masato: *See—*
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Ishikawa, Hiromichi; Kitaori, Kazuhiko; Kaneko, Kimiyoshi; Moriyama, Satoru; Kobayashi, Takashi; and Uchiyama, Tsugio, to Hokko Chemical Industry Co., Ltd. Organophosphoric acid ester anhydrides as pesticides. 4,421,750., Cl. 424-207.000.
Ishikawa, Takayoshi: *See—*
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Ishikawa, Yasuyuki: *See—*
Matsumura, Isao; Ishikawa, Yasuyuki; Hirano, Reiji; Maruyama, Shigeo; and Kobayakawa, Yoshimi, 4,421,391., Cl. 351-211.000.
Isono, Tokio; and Tanaka, Osami, to Honda Giken Kogyo Kabushiki Kaisha. Structure of an upper fork assembly of a motorcycle. 4,421,338., Cl. 280-279.000.
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Halewijn, Harry J., 4,421,263., Cl. 226-143.000.
Ito, Ikuo: *See—*
Furuto, Yoshio; Meguro, Shinichiro; Suzuki, Takuya; Ito, Ikuo; Ando, Toshinari; Nishi, Masataka; and Shimamoto, Susumu, 4,421,946., Cl. 174-128.00S.
Ito, Keiichi; Yamaguchi, Nobuyuki; Hayashi, Kazuhiko; Asami, Ken; Sato, Kazuo; and Ochiai, Takeshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Apparatus for running a vehicle at a constant speed. 4,421,192., Cl. 180-179.000.
Ito, Kenichi; Musha, Tohru; and Kato, Kiichi, to Olympus Optical Co. Ltd. Method and apparatus for detecting a focussing condition of an objective lens. 4,422,168., Cl. 369-45.000.
Ito, Toshio; Ninomiya, Hiroshi; and Yamagami, Kunio, to Nippon Kayaku Kabushiki Kaisha; Taiho Pharmaceutical Company Limited; and Nichiban Co. Ltd. Pressure-sensitive adhesive tape or pressure-sensitive adhesive sheet containing nitroglycerin. 4,421,737., Cl. 424-28.000.
Itoh, Hajime; and Igarashi, Yoshiyuki, to Toyota Jidosha Kogyo Kabushiki Kaisha. Wiper control device for vehicle. 4,422,024., Cl. 318-443.000.
Itsubo, Junichi: *See—*
Mori, Fumio; Itsubo, Junichi; Oda, Hiroyuki; and Matsuda, Gunji, 4,421,804., Cl. 428-35.000.
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Iwasawa, Teruo; and Tojiki, Hitomi, to Olympus Optical Co., Ltd. Starting circuit for electronically controlled motor apparatus. 4,422,023., Cl. 318-384.000.
Iwata, Seiichi: *See—*
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Izuta, Mitsugu: *See—*
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J. I. Case Company: *See—*
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J. M. Huber Corporation: *See—*
Wason, Satish K., 4,421,527., Cl. 51-308.000.
J. M. Smucker Company, The: *See—*
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Jackson, Arnold H.: *See—*
Knoll, Frank S.; and Jackson, Arnold H., 4,421,148., Cl. 141-392.000.
Jackson, Dennis E., to Cambridge Products, Ltd. Method for determining the concentration of selected ingredients in animal feeds. 4,421,858., Cl. 436-20.000.
Jacobs, John J., to Carrier Corporation. Method of operating a motor compressor unit. 4,421,460., Cl. 417-53.000.
Jaffe, Myron I., to Sintered Metals, Inc. Token mechanism with magnetic separation means. 4,421,220., Cl. 194-4.00D.
Jakobs, Willy, to Klockner-Humboldt-Deutz AG. Worm centrifuge. 4,421,502., Cl. 494-7.000.

James C. Barber and Associates, Inc.: *See*—
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James River Corporation: *See*—
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Japan Carlit Co., Ltd., The: *See*—
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Jidosha Kiki Co., Ltd.: *See*—
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Jinbo, Susumu; Kohno, Shoichi; and Kashima, Koichi, to Hodogaya Chemical Co., Ltd.; and Mochida Seiyaku Kabushiki Kaisha. 4-Oximino-1,2,3,4-tetrahydroquinoline derivatives. 4,421,919., Cl. 546-159.000.
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Jones, James L.; Keyser, E. Glen; and Phillips, James C., to Agrigenetics Corporation. Legume-inoculating composition. 4,421,544., Cl. 71-7.000.
Jorgensen, Robert A.; Farrell, Roger A.; and Gerhold, Bruce W., to General Electric Company. Dual stage-dual mode low emission gas turbine combustion system. 4,420,929., Cl. 60-39.060.
Joswig, Siegfried; Liebscher, Johannes; Keils, Peter; and Tiwi, Peter, to International Standard Electric Corporation. Device for feeding potted plants. 4,420,904., Cl. 47-81.000.
Joussemet, Robert: *See*—
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Jung, Heinrich; and Biskup, Ulrich, to Agfa-Gevaert Aktiengesellschaft. Process for the chain-lengthening of gelatine by partial hardening. 4,421,847., Cl. 430-621.000.
Jurek, John J., to General Signal Corporation. System for monitoring heater elements of electric furnaces. 4,421,976., Cl. 219-506.000.
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Kagiura, Kazuo; Miyake, Hiroyuki; Kasama, Nobuhiro; Sagara, Seiji; Sasaki, Nobukazu; and Yonemori, Takaji, to Canon Kabushiki Kaisha. Image recording apparatus. 4,421,401., Cl. 355-3.0FU.
Kahn, Marvin L.; and Lynch, Robert J., to Rich Products Corporation. Freezer stable whipped ice cream and milk shake food products. 4,421,778., Cl. 426-564.000.
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Kameda, Eiichi, to Nippon Mektron Co., Ltd. Panel keyboard with air permeable spacer. 4,421,958., Cl. 200-5.00A.
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Kanamaru, Hitoshi, to Universal Pioneer Corporation. Device for reducing the effect of time base variations in video disc player. 4,422,103., Cl. 358-320.000.
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Kataishi, Takao; and Yokoi, Nobufumi, to Misawa Home Co., Ltd. Corrosion protection pretreating apparatus. 4,421,130., Cl. 134-76.000.

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Kataoka, Hiroyuki: *See—*
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Katayose, Shinji; and Ohwada, Masatsugu, to Nissan Motor Company, Limited. Engine control apparatus. 4,421,082., Cl. 123-333.000.

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Kawai Musical Instrument Mfg. Co., Ltd.: *See—*
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Kawakami, Yoshio; Okamura, Masatoshi; Shiba, Haruo; and Hotsuki, Hideki. Leader tape. 4,422,119., Cl. 360-128.000.

Kawamoto, Isao; and Nakahara, Masaki, to Sankyo Company Limited. Anti-microbial diazole derivatives. 4,421,758., Cl. 424-273.00R.

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Kawasaki, Katsuyoshi, to Honda Giken Kogyo Kabushiki Kaisha. Tubing assembly in mutually movable portions of a three-wheeled motor vehicle. 4,421,194., Cl. 180-215.000.

Kawasaki Steel Corporation: *See—*
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KB Denver, Inc.: *See—*
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Keils, Peter: *See—*
Joswig, Siegfried; Liebucher, Johannes; Keils, Peter; and Tiwi, Peter, 4,420,904., Cl. 47-81.000.

Kekish, George T.; and Batton, Carol B., to Nalco Chemical Company. Side release agent for coal cars. 4,421,791., Cl. 427-239.000.

Keller, Bruce E.; Andrews, Robert B., Jr.; Wylie, Charles F.; and Brinkerhoff, Kenneth W., to Boeing Company, The. Machine tool controller and part inspection monitor. 4,422,150., Cl. 364-475.000.

Kelm, Gary R.: *See—*
Dixon, Thomas J.; and Kelm, Gary R., 4,421,769., Cl. 424-358.000.

Kendall Company, The: *See—*
Gilman, Thomas; and Miller, Frank N., 4,420,853., Cl. 15-111.000.

Kenjyo, Hideyuki, to Olympus Optical Co. Ltd. Digital microphone. 4,422,182., Cl. 455-614.000.

Kernforschungszentrum Karlsruhe G.m.b.H.: *See—*
Bohme, Georg; Kohler, Wolfgang; and Salaske, Manfred, 4,421,445., Cl. 414-4.000.
Schmidt, Kurt; and Jentzsch, Klaus, 4,421,464., Cl. 417-412.000.

Keswick, Paul D.: *See—*
Chuang, Patrick T.; and Keswick, Paul D., 4,421,996., Cl. 307-530.000.

Keyser, E. Glen: *See—*
Jones, James L.; Keyser, E. Glen; and Phillips, James C., 4,421,544., Cl. 71-7.000.

Khaw, Ban A.: *See—*
Haber, Edgar; and Khaw, Ban A., 4,421,735., Cl. 424-1.100.

Khimiko-metallurgicheshy Institut AN Kazakhskoi SSR: *See—*
Abishev, Dzhaatore N.; Malyshev, Vitaly P.; Bauer, Ivan K.; Yarygin, Vladimir A.; Maisakov, Mikhail E.; Gainutdinov, Garifulla K.; Nazarov, Alexandr M.; Kusainov, Temirkhan A.; Burovoi, Isaak A.; and Omarov, Bulat N., 4,422,174., Cl. 373-115.000.

Kida, Makoto: *See—*
Muroi, Masayuki; and Kida, Makoto, 4,421,688., Cl. 260-239.30B.

Kida, Shuji: *See—*
Uemura, Morito; Kishi, Kenichi; Nakagawa, Satoshi; Kida, Shuji; and Sugita, Hiroshi, 4,421,845., Cl. 430-544.000.

Kienzle, Wolfgang; and Krauss, Rudolf, to Robert Bosch GmbH. Injection valve. 4,421,278., Cl. 239-533.120.

Kiff, Ben W.; and Schreck, David J., to Union Carbide Corporation. Production of ethanol from acetic acid. 4,421,939., Cl. 568-885.000.

Killinger, Karl H., to Singer Company, The. Sewing machine head end module construction. 4,421,042., Cl. 112-259.000.

Kilpper, Gerhard: *See—*
Tonne, Peter; Ladwig, Winfried; Kilpper, Gerhard; and Grimmer, Johannes, 4,421,931., Cl. 564-139.000.

Kim Hotstart Mfg. Co., Inc.: *See—*
Stein, John, 4,421,975., Cl. 249-335.000.

Kimball International, Inc.: *See—*
Wilcox, Brian N.; and Robinson, John W., 4,421,001., Cl. 84-1.170.

Kimoto, Yasuo; Yamamoto, Masahiko; Tamiya, Katsunori; Sakai, Yoshihito; Komura, Akio; Honda, Shoichi; Machata, Hidehiko; Kamada, Hiroshi; Suzaki, Tomohiko; and Inoue, Tomoya, to Hitachi Shipbuilding & Engineering Co., Ltd. Apparatus for continuously processing a band-shape material. 4,421,624., Cl. 204-209.000.

Kimura, Minoru, to Tokyo Shibaura Denki Kabushiki Kaisha. Method of controlling channel length by implanting through polycrystalline and single crystalline regions followed by diffusion anneal. 4,420,870., Cl. 29-571.000.

Kimura, Shinji: *See—*
Ikezawa, Kenji; Takao, Hiroshi; Aoki, Hiroyuki; and Kimura, Shinji, 4,421,787., Cl. 427-126.200.

Kimura, Susumu: *See—*
Hatakeyama, Yoshiharu; and Kimura, Susumu, 4,421,705., Cl. 264-153.000.

King, Alton B.: *See—*
Crane, Roscoe K.; and King, Alton B., 4,421,094., Cl. 126-61.000.

King, Roderick V., to Ethyl Products Company. Apparatus for threading closures. 4,420,959., Cl. 72-113.000.

Kinoshita, Koichi: *See—*
Hosono, Nagao; Kinoshita, Koichi; and Takahashi, Toru, 4,421,057., Cl. 118-657.000.

Kinsley, Homan B., Jr., to James River Corporation. Solvent removal via continuously superheated heat transfer medium. 4,421,794., Cl. 427-377.000.

Kirchner, Robert D. Coolant recirculation system for dry cleaning plants. 4,421,158., Cl. 165-40.000.

Kiselak, John A., II: *See—*
Johnson, Lance H.; Kiselak, John A., II; Nadarzynski, Edward A.; and Pedersen, Raymond J., 4,422,144., Cl. 364-200.000.

Kishi, Hirotoshi: *See—*
Sato, Tadashi; Tsunoi, Haruo; and Kishi, Hirotoshi, 4,421,403., Cl. 355-8.000.

Kishi, Kenichi: *See—*
Uemura, Morito; Kishi, Kenichi; Nakagawa, Satoshi; Kida, Shuji; and Sugita, Hiroshi, 4,421,845., Cl. 430-544.000.

Kissick, Thomas P.: *See—*
Mueller, Richard H.; Cimarusti, Christopher M.; and Kissick, Thomas P., 4,421,686., Cl. 260-239.00A.

Kitagawa, Hiroshi; Sato, Masaaki; and Shuto, Shoji, to Mitsubishi Rayon Co., Ltd. Process for the production of sheet-like material

comprising split fibers and apparatus therefor. 4,421,584., Cl. 156-178.000.

Kitajima, Nobuyuki: *See*—
Kuzuoka, Shinichi; Tachibana, Yoshinori; Saito, Goro; and Kitajima, Nobuyuki, 4,421,599., Cl. 162-100.000.

Kitamura, Shinichi: *See*—
Hamano, Sachiyuki; Kitamura, Shinichi; Igarashi, Toshiji; and Nakajima, Yoshikage, 4,421,763., Cl. 424-285.000.

Kitaori, Kazuhiko: *See*—
Ishikawa, Hiromichi; Kitaori, Kazuhiko; Kaneko, Kimiyoshi; Moriyama, Satoru; Kobayashi, Takashi; and Uchiyama, Tsugio, 4,421,750., Cl. 424-207.000.

Kitasato Institute, The: *See*—
Kojima, Yasuhiko; Tamamura, Sadao; Konno, Seishi; and Hashimoto, Takashi, 4,421,746., Cl. 424-195.000.

Kito, Tutomu; Nakasuji, Norikazu; Kataoka, Takashi; Inagaki, Hiroshi; and Shibahashi, Yutaka, to Pilot Ink Company Ltd. Thermochromatic materials. 4,421,560., Cl. 106-21.000.

Kittredge, Lloyd G., to Pitney Bowes Inc. Printer control systems for electronic postage meter. 4,421,023., Cl. 101-45.000.

Kittredge, Lloyd G., to Pitney Bowes Inc. Security system for electronic device. 4,421,977., Cl. 235-101.000.

Kiwi, John: *See*—
Gratzel, Michael; and Kiwi, John, 4,421,617., Cl. 204-157.10R.

Klapper, Juergen: *See*—
Kreitner, Ludwig; Klapper, Juergen; and Schober, Horst, 4,421,642., Cl. 209-384.000.

Klausen, Glori J.: *See*—
Klausen, Jack H.; and Klausen, Glori J., 4,421,117., Cl. 128-555.000.

Klausen, Jack H.; and Klausen, Glori J., to Glori-Us Sportswear, Inc. Maternity garments. 4,421,117., Cl. 128-555.000.

Klein Associates, Inc.: *See*—
Klein, Martin, 4,422,166., Cl. 367-115.000.

Klein, Martin, to Klein Associates, Inc. Undersea sonar scanner correlated with auxiliary sensor trace. 4,422,166., Cl. 367-115.000.

Kleininger, Werner: *See*—
Burger, Rainer; and Kleininger, Werner, 4,421,024., Cl. 101-415.100.

Kliklok Corporation: *See*—
Hoyrup, S. Johannes; and Krause, Karl A., 4,420,924., Cl. 53-307.000.

Kline, Larry H. Lubricating object injector utilizing a single plunger. 4,421,504., Cl. 604-12.000.

Klockner-Humboldt-Deutz AG: *See*—
Jakobs, Willy, 4,421,502., Cl. 494-7.000.

Knapp, Alan G.: *See*—
Washington, Derek; and Knapp, Alan G., 4,422,005., Cl. 313-105.0CM.

Knecht, David C., to General Electric Company. Transverse arc tube mounting. 4,422,004., Cl. 313-25.000.

Knoll, Frank S.; and Jackson, Arnold H., to Carpco, Inc. Device for feeding particulate material. 4,421,148., Cl. 141-392.000.

Kobald, Walter, to Robert Bosch GmbH. Hydraulic system. 4,420,935., Cl. 60-427.000.

Kobayashi, Fujio: *See*—
Yamaguchi, Shoichiro; and Kobayashi, Fujio, 4,422,146., Cl. 364-414.000.

Kobayashi, Hiromi: *See*—
Yoshinaga, Yoichi; Kobayashi, Hiromi; Ueda, Shinjiro; Takada, Yoshihiro; and Nishida, Hideo, 4,421,457., Cl. 415-211.000.

Kobayashi, Masatoshi: *See*—
Fujii, Hiroyuki; Shimakawa, Joji; Hara, Yukio; and Kobayashi, Masatoshi, 4,421,621., Cl. 204-192.00C.

Kobayashi, Ryuichiro: *See*—
Ikeuchi, Satoru; Kanbe, Masaru; Takahashi, Jiro; Kobayashi, Ryuichiro; Suginaka, Shunji; and Mizukura, Noboru, 4,421,846., Cl. 430-559.000.

Kobayashi, Takao: *See*—
Morichika, Toshiaki; Sugitani, Junichi; and Kobayashi, Takao, 4,421,558., Cl. 75-128.00E.

Kobayashi, Takashi; Shikama, Takashi; Yamamoto, Tomoyuki; and Yokota, Atsuo, to Murata Manufacturing Co., Ltd. Combination starter-protector device. 4,422,120., Cl. 361-24.000.

Kobayashi, Takashi: *See*—
Ishikawa, Hiromichi; Kitaori, Kazuhiko; Kaneko, Kimiyoshi; Moriyama, Satoru; Kobayashi, Takashi; and Uchiyama, Tsugio, 4,421,750., Cl. 424-207.000.

Kobayashi, Tsuneki: *See*—
Matsumoto, Yoshikane; Kobayashi, Tsuneki; Kurosawa, Makoto; and Seino, Minoru, 4,421,430., Cl. 400-121.000.

Koch, Friedbert; and Schweinsberg, Bernhard, to C. Otto & Comp. G.m.b.H. Apparatus for guiding material in strip form. 4,421,623., Cl. 204-206.000.

Koch, Ulrich H.; and Babuder, Gerald A., to Whitey Co. End cap assembly. 4,421,293., Cl. 251-61.400.

Kocher, Willi; and Zimmermann, Jakob, to Werkzeugmaschinenfabrik Oerlikon-Burle AG. Manual cocking device for an automatic firing weapon. 4,421,006., Cl. 89-1.00K.

Kockler, Barry C.: *See*—
DuVall, Dale R.; and Kockler, Barry C., 4,422,100., Cl. 358-293.000.

Koehne, Rainer, to Pressbau GmbH. Method and device for the dry-spray application of concrete to a substrate. 4,421,797., Cl. 427-403.000.

Koehring Company: *See*—
Zemke, Wayne P.; Maki, Clyde M.; and Smith, Brian J., 4,421,435., Cl. 404-113.000.

Koeijmans, Gerard D.: *See*—
Bowden, Edgar A.; Deline, Gordon R.; and Koeijmans, Gerard D., 4,422,164., Cl. 367-15.000.

Kofler, Wilhelm, to Maschinenfabrik Benninger AG. Warp beam loading and unloading apparatus for a warping machine. 4,420,861., Cl. 28-196.000.

Kogure, Katsushige; Suzuki, Kenzo; and Kamimura, Masami, to Honda Giken Kogyo Kabushiki Kaisha. Combustion chamber for internal combustion engine. 4,421,080., Cl. 123-306.000.

Kohayakawa, Yoshimi: *See*—
Matsumura, Isao; Ishikawa, Yasuyuki; Hirano, Reiji; Maruyama, Shigeo; and Kohayakawa, Yoshimi, 4,421,391., Cl. 351-211.000.

Kohl, Arthur L.: *See*—
Ampaya, Jaime P.; Heredy, Laszlo A.; and Kohl, Arthur L., 4,421,631., Cl. 208-8.00R.

Kohler, George O.: *See*—
Edwards, Richard H.; and Kohler, George O., 4,421,682., Cl. 260-112.00R.

Kohler, Wolfgang: *See*—
Bohme, Georg; Kohler, Wolfgang; and Salaske, Manfred, 4,421,445., Cl. 414-4.000.

Kohno, Shoichi: *See*—
Jinbo, Susumu; Kohno, Shoichi; and Kashima, Koichi, 4,421,919., Cl. 546-159.000.

Kohsaka, Fusao: *See*—
Ueda, Toshitsugu; and Kohsaka, Fusao, 4,421,381., Cl. 350-6.600.

Kohshoh Limited: *See*—
Noda, Taizo, 4,420,858., Cl. 24-170.000.

Kojima, Yasuhiko; Tamamura, Sadao; Konno, Seishi; and Hashimoto, Takashi, to Kitasato Institute, The. Process for producing interferon inducers. 4,421,746., Cl. 424-195.000.

Kokusai Denshin Denwa Kabushiki Kaisha: *See*—
Mori, Hiromichi; Matsumoto, Jun; and Fujioka, Masanobu, 4,421,955., Cl. 179-18.0EA.

Kolev, Kolyo R.: *See*—
Radomirov, Radomir V.; Kolev, Kolyo R.; Enchev, Encho M.; and Ivanov, Ivan N., 4,422,065., Cl. 340-347.00P.

Kollmorgen Technologies Corporation: *See*—
McCamy, Calvin S., 4,422,135., Cl. 362-346.000.

Komeiji, Shigeki: *See*—
Futamura, Yoshisumi; Komeiji, Shigeki; Noro, Shuhei; Hasegawa, Junzo; Matsunari, Fumio; and Ikeda, Toshiaki, 4,421,494., Cl. 464-111.000.

Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, to Canon Kabushiki Kaisha. Electrophotographic device. 4,421,402., Cl. 355-8.000.

Komoriya, Keiji: *See*—
Okamura, Noriaki; Toru, Takeshi; Oba, Takeo; Tanaka, Toshio; Bannai, Kiyoshi; Watanabe, Kenzo; Kurozumi, Seizi; Naruchi, Tatsuyuki; and Komoriya, Keiji, 4,421,914., Cl. 544-278.000.

Komura, Akio: *See*—
Kimoto, Yasuo; Yamamoto, Masahiko; Tamiya, Katsunori; Sakai, Yoshihito; Komura, Akio; Honda, Shoichi; Machata, Hidehiko; Kamada, Hiroshi; Suzaki, Tomohiko; and Inoue, Tomoya, 4,421,624., Cl. 204-209.000.

Komuro, Takeo; Gomi, Kenichi; Arashi, Norio; Akimoto, Hidetoshi; Hishinuma, Yukio; Iinuma, Hajime; and Kanda, Osamu, to Hitachi, Ltd. Process for dry desulfurization of flue gas. 4,421,732., Cl. 423-569.000.

Komuro, Yoshiaki: *See*—
Shinkawa, Tsutomu; Yoshino, Akihide; Konishi, Hitoshi; Komuro, Yoshiaki; Hamada, Satoshi; and Okumura, Saburo, 4,421,152., Cl. 164-258.000.

Konaka, Yukio, to Shibuya Machine Company Ltd. Bottle packaging box. 4,421,232., Cl. 206-434.000.

Kondo, Hiroyuki: *See*—
Shinohara, Tatsuo; Oguri, Yukihiro; Fujimori, Yukio; and Kondo, Hiroyuki, 4,421,756., Cl. 424-258.000.

Kondo, Tatsunori, to Kabushiki Kaisha Kawai Gakki Seisakusho. Envelope generator for electronic musical instruments. 4,421,003., Cl. 84-1.260.

Kongo Co., Ltd: *See*—
Taniwaki, Genshi, 4,421,365., Cl. 312-198.000.

Koninklijke Brinkers Margarinefabrieken B.V.: *See*—
Brinkers, Bernardus H. C.; and Veenman, Willem B. A. N., 4,421,776., Cl. 426-502.000.

Konishi, Hitoshi: *See*—
Shinkawa, Tsutomu; Yoshino, Akihide; Konishi, Hitoshi; Komuro, Yoshiaki; Hamada, Satoshi; and Okumura, Saburo, 4,421,152., Cl. 164-258.000.

Konishi, Kiyoshi: *See*—
Morisawa, Yasuhiro; Konishi, Kiyoshi; and Kataoka, Mitsuru, 4,421,766., Cl. 424-311.000.

Konishiroku Photo Industry Co., Ltd.: *See*—
Ikeuchi, Satoru; Kanbe, Masaru; Takahashi, Jiro; Kobayashi, Ryuichiro; Suginaka, Shunji; and Mizukura, Noboru, 4,421,846., Cl. 430-559.000.
Uemura, Morito; Kishi, Kenichi; Nakagawa, Satoshi; Kida, Shuji; and Sugita, Hiroshi, 4,421,845., Cl. 430-544.000.

Konno, Seishi: *See*—
Kojima, Yasuhiko; Tamamura, Sadao; Konno, Seishi; and Hashimoto, Takashi, 4,421,746., Cl. 424-195.000.

Konstantinov, Mihail S.: *See*—
Petrov, Alexander S.; and Konstantinov, Mihail S., 4,420,964., Cl. 72-451.000.

Kontis, George E.; and Evans, Sherwood P., to United States of America, Army. Timed round stop for a sprocket fed weapon. 4,421,008., Cl. 89-33.0CA.

Koppers Company, Inc.: *See*—
Thurston, Kent W.; and Barnes, Jesse H., 4,421,328., Cl. 277-216.000.

Korczak, Alexander; and Levis, William W., Jr., to BASF Wyandotte Corporation. Propylene oxide adducts of toluenediamine. 4,421,871., Cl. 521-167.000.

Kornatowski, Boleslaw; and Adams, Kenneth D., to Singer Company, The. Convertible bed for a sewing machine. 4,421,043., Cl. 112-260.000.

Kornrumpf, William P., to General Electric Company. Power supply for low-voltage load. 4,422,138., Cl. 363-21.000.

Kornylak, Andrew T., to Kornylak Corporation. Tilting shelf, vertical conveyor. 4,421,227., Cl. 198-800.000.

Kornylak Corporation: *See*—
Kornylak, Andrew T., 4,421,227., Cl. 198-800.000.

Kosak, Werner; and Matschinsky, Wolfgang, to Bayerische Motoren Werke. Individual wheel suspension for non-steered wheels of motor vehicles, especially automobiles. 4,421,332., Cl. 280-95.00R.

Kosmahl, Henry G., to United States of America, National Aeronautics and Space Administration. Ladder supported ring bar circuit. 4,422,012., Cl. 315-3.500.

Kosmowski, Wojciech B., to Cooper Industries, Inc. Workpiece holding and alignment device. 4,421,305., Cl. 269-287.000.

Kostka, Hana: *See*—
Gulden, Peter; Michel, Alfred; and Kostka, Hana, 4,421,476., Cl. 431-243.000.

Kosugi, Ikutaka: *See*—
Matsubara, Hideyuki; Kosugi, Ikutaka; and Tsukamoto, Chiaki, 4,421,821., Cl. 428-323.000.

Kotani, Shigenori: *See*—
Hidaka, Hiroyoshi; Matsumoto, Ikuo; Yoshizawa, Junji; and Kotani, Shigenori, 4,421,754., Cl. 424-250.000.

Koto, Toshio; Murakami, Katsuhiko; and Fujitani, Yugo, to Kabushiki Kaisha Ishida Koki Seisakusho. Combinatorial weighing system. 4,421,185., Cl. 177-25.000.

Kouno, Toshio. Cargo handling apparatus. 4,421,450., Cl. 414-719.000.

Kourtz, Raymond E.; and Daftary, Shashikumar H., to American Cyanamid Company. Acrylic wet spinning process. 4,421,707., Cl. 264-182.000.

Kovach, Curtis W.: *See*—
Rossomme, Paul A.; Eckenrod, John J.; Kovach, Curtis W.; and Pinnow, Kenneth E., 4,421,557., Cl. 75-125.000.

Kraemer, John F.: *See*—
Seeney, Charles E.; Kraemer, John F.; and Varnum, Nancy C., 4,421,873., Cl. 523-145.000.

Kraft, Klaus: *See*—
Eimers, Erich; Kraft, Klaus; and Margotte, Dieter, 4,421,879., Cl. 523-500.000.

Kramer, Fritz, to Sanifoam, Inc. Method and apparatus for coating a substrate with foamed plastic. 4,421,788., Cl. 427-136.000.

Kramer, Volker; and Helsper, Gunter, to Dr. Ing. h.c.F. Porsche Aktiengesellschaft. Coupling means comprising a centering device and a locking mechanism for a motor driven utility unit having a complementary unit. 4,421,340., Cl. 280-478.00B.

Kraul, Douglas R.: *See*—
Davis, Walter L.; and Kraul, Douglas R., 4,422,162., Cl. 365-227.000.

Kraus, Werner. Electrification attachment for an osteosynthesis implantate. 4,421,115., Cl. 128-419.00F.

Krause, Karl A.: *See*—
Hoyrup, S. Johannes; and Krause, Karl A., 4,420,924., Cl. 53-307.000.

Krause, Klaus-Dieter: *See*—
Gubbe, Bernd; Krause, Klaus-Dieter; Schonemann, Otto; and Neidhardt, Rudolf, 4,421,035., Cl. 108-6.000.

Krauss, Rudolf: *See*—
Kienzle, Wolfgang; and Krauss, Rudolf, 4,421,278., Cl. 239-533.120.

Krausser, Werner: *See*—
Dorrfub, Klaus; and Krausser, Werner, 4,421,431., Cl. 400-124.000.

Krebser, Rudolf: *See*—
Egger, Caspar; Krebser, Rudolf; and Leuzinger, Hans, 4,421,469., Cl. 425-183.000.

Kreis, Philipp, to Philipp Kreis GmbH & Co. Room heating apparatus for small spaces. 4,421,095., Cl. 126-91.00R.

Kreitner, Ludwig; Klapper, Juergen; and Schober, Horst, to BASF Aktiengesellschaft. Device for separating grinding medium and milled suspension in a wet comminuting machine. 4,421,642., Cl. 209-384.000.

Kressel, Henry; and Hsu, Sheng T., to RCA Corporation. Memory array with redundant elements. 4,422,161., Cl. 365-200.000.

Kriesi, Ruedi: *See*—
Posnansky, Mario; and Kriesi, Ruedi, 4,421,102., Cl. 126-438.000.

Krinski, Thomas L.: *See*—
Graham, Paul M.; and Krinski, Thomas L., 4,421,564., Cl. 106-154.00R.

Krob, Erwin; and Bauer, Helmut, to TMC Corporation. Safety ski binding. 4,421,341., Cl. 280-628.000.

Kroener, Michael: *See*—
Brunnmueller, Fritz; Schneider, Rolf; Kroener, Michael; Mueller, Hans; and Linhart, Friedrich, 4,421,602., Cl. 162-168.200.

Kroger, Harry, to Sperry Corporation. Superconductive tunnel junction device and method of manufacture. 4,421,785., Cl. 427-63.000.

Kropielnicki, Jerzy J., to B.S.H. Electronics (Manchester) Limited. Electrical signal separating device for combined windshield antenna and heater grid. 4,422,077., Cl. 343-704.000.

Krowech, Robert J., to Deltak Corporation. Apparatus and method for soot cleaning in high-pressure heat exchangers. 4,421,067., Cl. 122-390.000.

Krueger, David C.: *See*—
Suh, Kyung W.; Krueger, David C.; and Zehner, Burch E., 4,421,866., Cl. 521-79.000.

Krueger, Robert T.: *See*—
Revak, Timothy T.; and Krueger, Robert T., 4,421,529., Cl. 55-16.000.

Kruger, Bruno; Winkler, Adolf; and Hentze, Gunter, to Bayer Aktiengesellschaft. Process for the preparation of nitroanilines. 4,421,694., Cl. 260-465.00E.

Kubota Ltd.: *See*—
Morichika, Toshiaki; Sugitani, Junichi; and Kobayashi, Takao, 4,421,558., Cl. 75-128.00E.

Kucharczyk, Eckard, to Siegenia-Frank KG. Closure hardware. 4,420,905., Cl. 49-192.000.

Kudo, Takeo; Okada, Yasutaka; Morooshi, Taishi; Ikeda, Akio; Ohtani, Hiroo; and Yoshikawa, Kunihiko, to Sumitomo Metal Industries, Ltd. Process for making high strength deep well casing and tubing having improved resistance to stress-corrosion cracking. 4,421,571., Cl. 148-11.50R.

Kuhl, Henry Y. Cart washing apparatus. 4,421,132., Cl. 134-123.000.

Kuhne, Christoph, to Carl-Zeiss-Stiftung, Heidenheim/Brenz. Position encoder with closed-ring diode array. 4,421,980., Cl. 250-231.05E.

Kuipers, Peter, to Nordson Corporation. Tube forming shoe and method of forming a flexible web into a shoe. 4,421,499., Cl. 493-23.000.

Kujawski, Edmund. Y Pattern valve. 4,421,298., Cl. 251-368.000.

Kukes, Simon G.: *See*—
Nowack, Gerhard P.; Johnson, Marvin M.; and Kukes, Simon G., 4,421,638., Cl. 208-251.00R.

Kulischenko, Walter, to Pennwalt Corporation. Balanced composite flexible shaft assembly capable of operating in a tight radius. 4,421,495., Cl. 464-51.000.

Kulprathipanja, Santi; and deRosset, Armand J., to UOP Inc. Separatory process using organic bound adsorbents. 4,421,567., Cl. 127-46.300.

Kumamoto, Sadahiro: *See*—
Yamamoto, Sakuei; Inao, Hiroshi; Tokumitsu, Kiyonori; Nishida, Mitsuhiro; and Kumamoto, Sadahiro, 4,421,324., Cl. 277-24.000.

Kumata, Kiyoshi, to Sharp Kabushiki Kaisha. Electronic timepiece with variable melody alarm faculties. 4,421,422., Cl. 368-273.000.

Kummerlin, Walter. Ladder. 4,421,206., Cl. 182-156.000.

Kunze, Robert K., Jr.: *See*—
Nelsen, Murray D.; Kunze, Robert K., Jr.; Olsen, Robert F.; and Rushwald, Ira B., 4,421,201., Cl. 181-214.000.

Kuraoka, Yasuo, to Hoxan Corporation. Helium gas liquefying apparatus. 4,421,537., Cl. 62-22.000.

Kuraray Co., Ltd.: *See*—
Nakashima, Toshihide; Tanihara, Maso; and Takakura, Koichi, 4,421,684., Cl. 260-112.00B.

Kuroiwa, Hiroshi; and Oyama, Yoshishige, to Hitachi, Ltd. Air intake measuring apparatus for internal combustion engine. 4,420,972., Cl. 73-118.000.

Kuroki, Yoshiaki: *See*—
Umemura, Sumio; Fujii, Kozo; Nishihira, Keigo; Sawada, Hiroyuki; Tanaka, Shuji; Nakai, Mamoru; Yoshida, Hiroshi; and Kuroki, Yoshiaki, 4,421,925., Cl. 549-372.000.

Kurosawa, Makoto: *See*—
Matsumoto, Yoshikane; Kobayashi, Tsuneki; Kurosawa, Makoto; and Seino, Minoru, 4,421,430., Cl. 400-121.000.

Kurozumi, Seizi: *See*—
Okamura, Noriaki; Toru, Takeshi; Oba, Takeo; Tanaka, Toshio; Bannai, Kiyoshi; Watanabe, Kenzo; Kurozumi, Seizi; Naruchi, Tatsuyuki; and Komoriya, Keiji, 4,421,914., Cl. 544-278.000.

Kurple, William M., to Midland-Ross Corporation. Constant energy transfer rate strobe source. 4,422,016., Cl. 315-241.00S.

Kurzweil, Jack H.: *See*—
Bingham, John A. C.; and Kurzweil, Jack H., 4,422,175., Cl. 375-14.000.

Kusaba, Yoshiaki; and Hayashi, Chihiro, to Sumitomo Metal Industries, Ltd. Method for producing beam blank for universal beam. 4,420,961., Cl. 72-221.000.

Kusainov, Temirkhan A.: *See*—
Abishev, Dzhantore N.; Malyshev, Vitaly P.; Bauer, Ivan K.; Yarygin, Vladimir A.; Mainakov, Mikhail E.; Gainutdinov, Garifulla K.; Nazarov, Alexandr M.; Kusainov, Temirkhan A.; Burovoi, Isaak A.; and Omarov, Bulat N., 4,422,174., Cl. 373-115.000.

Kushibiki, Junichi: *See*—
Momii, Isao; Chubachi, Noriyoshi; and Kushibiki, Junichi, 4,420,979., Cl. 73-644.000.

Kusubayashi, Toshiaki: *See*—
Hirakawa, Tadashi; Kusubayashi, Toshiaki; and Oku, Yukio, 4,420,999., Cl. 83-345.000.

Kutter, Eberhard: *See*—
Benedikter, Lothar; and Kutter, Eberhard, 4,421,755., Cl. 424-256.000.

Kuwahara, Toru: *See*—
Nakahara, Motohiro; Miyajiri, Tetsuo; Yoshioka, Naoki; and Kuwahara, Toru, 4,421,540., Cl. 65-3.120.

Kuzuoka, Shinichi; Tachibana, Yoshinori; Saito, Goro; and Kitajima, Nobuyuki, to Toppan Printing Co., Ltd. Fibrous materials. 4,421,599., Cl. 162-100.000.

Kwoon Kwen Metal Ware Company Ltd.: *See*—
Li, Sze Y., 4,420,956., Cl. 70-312.000.

Kyle, James C., to Kyle, James C. Polycrystalline insulating material seals between spaced members such as a terminal pin and a ferrule. 4,421,947., Cl. 174-152.0GM.

L.R. & N.R. Gedye Pty. Limited: *See*—
Gedye, Laurence R., 4,421,644., Cl. 210-233.000.

Labarre, Ernest D.: *See*—
Wallace, Edward M.; Gosselin, Robert G.; and Labarre, Ernest D., 4,420,883., Cl. 30-251.000.

Labbe, Francis A. M.: *See*—
Arthur, Hugh M.; and Labbe, Francis A. M., 4,421,055., Cl. 118-620.000.

Laky, Tibor; Lane, William C.; and Turner, Kebbie J., Sr., to Otis Engineering Corporation. Mooring system. 4,421,286., Cl. 244-116.000.

Lambert, John S.; and Gleitsmann, Joseph W., deceased (by Gleitsmann, Virginia E., executrix), to Foster Wheeler Energy Corporation. Recovery of deasphalting solvent. 4,421,639., Cl. 208-309.000.

Landis, William R.: *See*—
Clark, Rodney L.; Landis, William R.; Patton, Paul B.; and Yancey, Charles B., 4,422,067., Cl. 340-508.000.

Lane, William C.: *See*—
Laky, Tibor; Lane, William C.; and Turner, Kebbie J., Sr., 4,421,286., Cl. 244-116.000.

Lang, Hans-Jochen; Seuring, Bernhard; and Granzer, Ernold, to Hoechst Aktiengesellschaft. Thiazoline derivatives, processes for their preparation, their use and pharmaceutical preparations based on these compounds. 4,421,757., Cl. 424-270.000.

Langdon, Roger M., to Marconi Company Limited, The. Mass flow measurement device. 4,420,983., Cl. 73-861.180.

Langner, Carl G., to Shell Oil Company. Corrugated buckle arrestor. 4,421,437., Cl. 405-166.000.

Lansing Research Corporation: *See*—
Smithline, Leonard M.; and Wolga, George J., 4,422,154., Cl. 364-571.000.

LaRochelle, Ronald W.: *See*—
Eckberg, Richard P.; and LaRochelle, Ronald W., 4,421,904., Cl. 528-27.000.

Larson, Kenneth N.: *See*—
Wortley, David L.; and Larson, Kenneth N., 4,422,171., Cl. 371-32.000.

Larue, Joseph: *See*—
Rojey, Alexandre; Larue, Joseph; and Barreau, Alain, 4,420,946., Cl. 62-101.000.

Latham, Allen, Jr.; and Schoendorfer, Donald W., to Haemonetics Corporation. Fluid processing centrifuge and apparatus thereof. 4,421,503., Cl. 494-17.000.

Laughon, Thomas C.; and Philpott, Michael I., to Texas Instruments Incorporated. Electronic learning aid and game. 4,421,487., Cl. 434-169.000.

Laura Metaal B.V.: *See*—
Scheepers, Joseph G. B., 4,421,440., Cl. 405-282.000.

Laurer, George J.; and Stokes, Olen L., Jr., to International Business Machines Corporation. Decoding method for multicharacter labels. 4,421,978., Cl. 235-462.000.

Lavely, Frank E.: *See*—
Maike, Bruce R.; Fladt, Carl S.; and Lavely, Frank E., 4,421,478., Cl. 431-351.000.

Lavene, Bernard, to Electronic Concepts, Inc. Substantially small sized wound capacitor and manufacturing method therefor. 4,422,127., Cl. 361-323.000.

Lawrence, Bernard L. Fire rescue system. 4,421,204., Cl. 182-50.000.

Leam, John A. Waste material treatment furnace. 4,421,037., Cl. 110-238.000.

Leaver, Daniel C.: *See*—
Hoff, Herbert L.; and Leaver, Daniel C., 4,421,453., Cl. 415-88.000.

LeBaron, Marc, to Lincoln Plating Company. Article holder for electroplating process. 4,421,627., Cl. 204-297.00W.

Lebedkova, Valentina A.: *See*—
Bildjukevich, Viktor L.; Turovsky, Leonid N.; Meleshko, Vyacheslav J.; Yakimovich, Dmitry T.; Lebedkova, Valentina A.; Demidovich, Boris K.; Plavnik, Gennady Z.; Dubrovsky, Nikolai N.; Proskalovich, Evgeny A.; and Pivovarov, Alexandr I., 4,421,594., Cl. 159-4.00R.

Leblanc, Conrad: *See*—
DeLisle, Richard W.; and Leblanc, Conrad, 4,421,110., Cl. 128-60.000.

Leconte, Andre: *See*—
Arnoux, Daniel; Leconte, Andre; Genter, Claude; and Michel, Bernard, 4,420,918., Cl. 52-157.000.

Le Dain, Michel; and Ritschard, Werner, to Hoffmann-La Roche Inc. Process for the deproteinization of biological fluids. 4,421,653., Cl. 210-692.000.

Ledamoisel, Claude: *See*—
Bertin, Patrice; and Ledamoisel, Claude, 4,421,191., Cl. 180-132.000.

Lederrey, Marc, to Montres Rado S.A. Watertight wrist-watch casing. 4,421,423., Cl. 368-291.000.

Lee, Bert, to Morgan, Jeff D. Downhole pump. 4,421,463., Cl. 417-383.000.

Lee, Chung J., to Plastics Engineering Company. Process for preparing polyimides end-capped with anhydride or isocyanate groups. 4,421,905., Cl. 528-56.000.

Lee, Gim F., Jr.: *See*—
Cooper, Glenn D.; Lee, Gim F., Jr.; and Shufelt, Rainey A., 4,421,883., Cl. 524-127.000.

Lee, James A.: *See*—
Ritter, Alexander S.; and Lee, James A., 4,420,903., Cl. 47-81.000.

Lee, John N.: *See*—
Berg, Norman J.; Abramovitz, Irwin J.; Casseday, Michael W.; and Lee, John N., 4,421,388., Cl. 350-358.000.

Leesona Corporation: *See*—
Brouwer, Charles W., 4,421,141., Cl. 139-54.000.

Legille, Edouard: *See*—
Metz, Paul; Legille, Edouard; Schleimer, Francois; and Weiner, Antoine, 4,421,555., Cl. 75-53.000.

Lehmann, Hans: *See*—
Gutekunst, Ferdinand; Lehmann, Hans; and Schmid, Rolf, 4,421,897., Cl. 525-119.000.

Lehnen, James A. Arm rest construction. 4,421,358., Cl. 297-421.000.

Lehner, August; Werther, Heinz U.; Naegele, Dieter; Lenz, Werner; Jun, Mong-Jon; Reimann, Horst; and Eckell, Albrecht, to Basf Aktiengesellschaft. Photopolymerizable recording material containing a diisocyanate modified nylon binder. 4,421,840., Cl. 430-273.000.

Lehnert, Stanley E.; and Ankeny, Donald, to Zenith Radio Corporation. Vertical image correction for projection TV. 4,422,020., Cl. 315-371.000.

Lehtinen, Alpo S. Heating boiler. 4,421,064., Cl. 122-15.000.

Leila, Lennox M.: *See*—
Pryputsch, Gunter G.; Leila, Lennox M.; Parkinson, Gerald E.; and Arneson, Leonard A., 4,421,018., Cl. 99-447.000.

Leland Stanford Junior University, The Board of Trustees of the: *See*—
Byer, Robert L.; and Fejer, Martin M., 4,421,721., Cl. 422-109.000.
Spicer, William E., 4,421,577., Cl. 148-187.000.

Lemaster, Glenn A., to Sepco Enterprises, Inc. Air foil construction. 4,421,354., Cl. 296-1.00S.

Lenz, Werner: *See*—
Lehner, August; Werther, Heinz U.; Naegele, Dieter; Lenz, Werner; Jun, Mong-Jon; Reimann, Horst; and Eckell, Albrecht, 4,421,840., Cl. 430-273.000.

Leon, Theodoor P. C.; and Berns, Joseph F., Jr., to Manurhin Automatic Division of Mitac, Inc. Bar feed mechanism. 4,421,446., Cl. 414-17.000.

Leonard, Edward F., to Procter & Gamble Company, The. Articulated fabric formed by self-assembling fibers. 4,421,818., Cl. 428-222.000.

Leonberger, Frederick J.; Melngailis, Ivars; Bozler, Carl O.; and McClelland, Robert W., to Massachusetts Institute of Technology. Optical guided wave devices employing semiconductor-insulator structures. 4,420,873., Cl. 29-576.00E.

Les Cables de Lyon: *See*—
Bourget, Jean-Claude, 4,420,881., Cl. 29-825.000.

Leuzinger, Hans: *See*—
Egger, Caspar; Krebser, Rudolf; and Leuzinger, Hans, 4,421,469., Cl. 425-183.000.

Leva, Donn W. Adjustable fin system. 4,421,492., Cl. 441-79.000.

Levens, Dennis L., to Minnesota Mining and Manufacturing Co. Ultraviolet polymerization of acrylate monomers using oxidizable tin compounds. 4,421,822., Cl. 428-343.000.

Lever Brothers Company: *See*—
Cox, Roger B.; Steer, David C.; and Woodward, John R., 4,421,668., Cl. 252-174.120.
Rudy, Jerome; and Rapisarda, Anthony A., 4,421,792., Cl. 427-242.000.

Levis, William W., Jr.: *See*—
Korczak, Alexander; and Levis, William W., Jr., 4,421,871., Cl. 521-167.000.

Lewis, Donald J.; and Phipps, Jack R., to Bendix Corporation, The. Fuel injector. 4,421,280., Cl. 239-585.000.

Lewis, Henry G., Jr.; and Acampora, Alfonse, to RCA Corporation. Digital signal processor with symmetrical transfer characteristic. 4,422,094., Cl. 358-37.000.

Li, Sze Y., to Kwoon Kwen Metal Ware Company Ltd. Combination lock. 4,420,956., Cl. 70-312.000.

Libbey-Owens-Ford Company: *See*—
Hetman, Thomas, Jr., 4,421,225., Cl. 198-345.000.

Licentia Patent-Verwaltungs-GmbH: *See*—
Minner, Willy; Bohme, Rolf; Siegle, Martin; and Rinderle, Heinz, 4,422,033., Cl. 323-314.000.

Lickei, Donald L.: *See*—
O'Connor, James M.; Lickei, Donald L.; and Sessions, Willie J., 4,421,894., Cl. 525-28.000.

Lidkopings Mekaniska Verkstads AB: *See*—
Lorsson, Sture, 4,420,910., Cl. 51-165.880.

Lieb, M. Jeremy, to Honeywell Inc. Key switch cap mounting arrangement. 4,421,432., Cl. 400-492.000.

Liebscher, Johannes: *See*—
Joswig, Siegfried; Liebscher, Johannes; Keils, Peter; and Tiwi, Peter, 4,420,904., Cl. 47-81.000.

Lieffers, William C., to Union Oil Company of California. Geothermal power plant. 4,420,938., Cl. 60-641.500.

Lienau, Jeffrey A., to United States of America, Army. Magnet position sensing system. 4,422,041., Cl. 324-207.000.

Ligorati, Ferdinando: *See*—
Invernizzi, Renzo; Ligorati, Ferdinando; Fontanesi, Maurizio; and Catenacci, Roberto, 4,421,674., Cl. 502-154.000.

Lillie, Terrance L.: *See*—
Couper, Robert A.; Frediani, John K.; and Lillie, Terrance L., 4,422,070., Cl. 340-723.000.

Lin, Peter T., to RCA Corporation. Apparatus for coating recorded discs with a lubricant. 4,421,798., Cl. 427-421.000.

Lin, Shao C. Heat-dissipating device operated by solar energy. 4,421,159., Cl. 165-44.000.

Linares, Hubert: *See*—
Baudouin, Michel; and Linares, Hubert, 4,421,918., Cl. 546-153.000.

Lincoln Plating Company: *See*—
LeBaron, Marc, 4,421,627., Cl. 204-297.00W.

Lindblad, Cyril M. Doweling jig. 4,421,442., Cl. 408-115.00R.

Lindner, Christian; and Ott, Karl-Heinz, to Bayer Aktiengesellschaft. Rubber powders. 4,421,901., Cl. 525-309.000.

Lindstrom, Merlin R.: *See*—
Louthan, Rector P.; Macdonell, Gary D.; and Lindstrom, Merlin R., 4,421,667., Cl. 252-156.000.

Lindstrom, Olle. Furnace. 4,421,040., Cl. 110-294.000.

Linhart, Friedrich: *See*—
Brunnmueller, Fritz; Schneider, Rolf; Kroener, Michael; Mueller, Hans; and Linhart, Friedrich, 4,421,602., Cl. 162-168.200.

Lipschitz, Abraham. Hydrodynamic non-contacting seal for rotary machines. 4,421,321., Cl. 277-3.000.

Liqui-Box Corporation: *See*—
Bond, Curtis J.; and Ulm, John G., 4,421,146., Cl. 141-349.000.

Liu, Yet-Zen, to Rockwell International Corporation. Backside illuminated imaging charge coupled device. 4,422,091., Cl. 357-24.000.

Llinares, Vincent, Jr., to Combustion Engineering, Inc. Pulverized coal-fired burner. 4,421,039., Cl. 110-263.000.

Lloyd, Eugene A.; Madri, Peter; and Closson, William J. Contact lens cleaning composition containing lipid solvent and method of using. 4,421,665., Cl. 252-106.000.

Lockheed Missiles & Space Company, Inc.: *See*—
Marks, Burton S.; Mauri, Richard E.; and Watsey, Gazel W., 4,421,806., Cl. 428-36.000.

Loepfe Brothers Limited: *See*—
Weidmann, Erich, 4,421,143., Cl. 139-341.000.

Loew, Peter; and Zink, Rudolf, to Ciba-Geigy Corporation. Mixtures of cationic dyes: naphtho-lactam and oxazine dyes for polyacrylonitriles. 4,421,519., Cl. 8-644.000.

Lofstrom, Per, to AGA Aktiebolag. Method and apparatus for supplying oxygen gas for fuel combustion. 4,421,273., Cl. 239-8.000.

Logie, James A.; and Wilson, Arthur G., to Exxon Research and Engineering Co. Internal test method and apparatus for facsimile transceiver. 4,422,098., Cl. 358-256.000.

Loiten, Kjell O.: *See*—
Giskehaug, Karl J.; Loiten, Kjell O.; and Mejdell, Glor T., 4,421,649., Cl. 210-634.000.

Lombardo, Paul; Patarini, Leon; and Imlah, James, to Sherwin-Williams Company, The. Two-piece quad-seal closure with plug shock absorbing end panel. 4,421,247., Cl. 220-354.000.

Londerville, Steve B., to Coen Company, Inc. Apparatus for operating a burner at an optimal level. 4,421,473., Cl. 431-76.000.

Long, Gene M.; DeWitt, Terry E.; and Bell, John R., III, to AMCA International. Roof ridge structure and system. 4,420,913., Cl. 52-57.000.

Lonza Ltd.: *See*—
Grayson, James I.; and Dinkel, Rolf, 4,421,921., Cl. 546-251.000.
Miller, Raimund; and Tenud, Leander, 4,421,922., Cl. 549-313.000.

Lord, David E., to United States of America, Energy. In-situ measurement system. 4,420,974., Cl. 73-154.000.

L'Oreal: *See*—
Bore, Pierre; and de Labbey, Arnaud. 4,421,859., Cl. 436-86.000.
Bouillon, Claude; and Vayssie, Charles, 4,421,739., Cl. 424-47.000.
Boulogne, Jean; Hochmann, Tibaud; Michelet, Jacques; and Morane, Bruno, 4,421,128., Cl. 132-88.500.

Lorenz, Roland: *See*—
Bruninx-Poesen, Leonce M. J.; Drop, Peter C.; Kaldenhoven, Lambert C. I.; Lorenz, Roland; and Endevoets, Willy J. C., 4,422,011., Cl. 313-642.000.

Lorsson, Sture, to Lidkopings Mekaniska Verkstads AB. Control device for a grinding machine. 4,420,910., Cl. 51-165.880.

Lou, Kwong-Li. Electric tooth paste tube warmer. 4,421,973., Cl. 219-301.000.

Louthan, Rector P.; Macdonell, Gary D.; and Lindstrom, Merlin R., to Phillips Petroleum Company. Sulfur based metal cleaners. 4,421,667., Cl. 252-156.000.

Louzil, Friedrich, to U.S. Philips Corporation. Jet nozzle plate for an ink jet printing head and method of manufacturing such a jet nozzle plate. 4,422,082., Cl. 346-75.000.

Lovgren, Eric M.: *See*—
Schmidt, Lawrence R.; and Lovgren, Eric M., 4,421,907., Cl. 528-128.000.

Lowe, Robert E., to General Foods Corporation. Linerless carton including easily openable pouring spout. 4,421,236., Cl. 206-621.000.

Loyd, Ronald C.: *See*—
Tuggle, Lloyd H.; and Loyd, Ronald C., 4,421,176., Cl. 172-41.000.

Lucas Industries Limited: *See*—
Broadwith, Brian E.; and Skinner, Robert T. J., 4,421,084., Cl. 123-365.000.
Seilly, Alec H., 4,421,088., Cl. 123-447.000.

Ludikhuize, Adrianus W.: *See*—
Vaes, Henricus M. J.; Appels, Johannes A.; and Ludikhuize, Adrianus W., 4,422,089., Cl. 357-22.000.

Ludwig, Winfried: *See*—
Tonne, Peter; Ludwig, Winfried; Kilpper, Gerhard; and Grimmer, Johannes, 4,421,931., Cl. 564-139.000.

Lundberg, Robert D.; Thaler, Warren A.; and Agarwal, Pawan K., to Exxon Research and Engineering Co. Blend compounds of sulfonated polymers and compositions thereof. 4,421,882., Cl. 524-31.000.

Lundberg, Robert D.; and Thaler, Warren A., to Exxon Research and Engineering Co. Sulfonated polymer and compositions thereof. 4,421,898., Cl. 525-186.000.

Lundell, Ulf: *See*—
Gedeon, Andras; Lundell, Ulf; and Pilesvik, Goran, 4,421,113., Cl. 128-204.230.

Lundman, Phillip L. Vehicle ramp. 4,421,300., Cl. 254-88.000.

Lynch, Dan K., to Monsanto Company. Crystal purification. 4,421,937., Cl. 568-708.000.

Lynch, Henry J.: *See*—
Fleishman, Leonard; and Lynch, Henry J., 4,421,180., Cl. 173-124.000.

Lynch, Robert J.: *See*—
Kahn, Marvin L.; and Lynch, Robert J., 4,421,778., Cl. 426-564.000.

Lyudkovsky, Grigory, to Inland Steel Company. Method for suppressing internal oxidation in steel with antimony addition. 4,421,574., Cl. 148-111.000.

M.A.N. Maschinenfabrik Augsburg Nurnberg Aktiengesellschaft: *See*—
Hagin, Faust, 4,421,339., Cl. 280-460.00R.

M.A.N.-ROLAND Druckmaschinen Aktiengesellschaft: *See*—
Burger, Rainer; and Kleininger, Werner, 4,421,024., Cl. 101-415.100.
Fischer, Hermann, 4,421,027., Cl. 101-142.000.

Maascom B.V.: *See*—
Scheepers, Joseph G. B., 4,421,440., Cl. 405-282.000.

Maass, Klaus-Dieter: *See*—
Gartner, Robert; Maass, Klaus-Dieter; and Senninger, Georg, 4,421,234., Cl. 206-509.000.

Maass, Manfred: *See*—
Dudeck, Ingo; and Maass, Manfred, 4,420,968., Cl. 73-35.000.

Mabon, Stuart P., to Microcpolis Corporation. Stepping motor drive system. 4,422,113., Cl. 360-78.000.

Macabrey, Louis: *See*—
Bonnebat, Claude; and Macabrey, Louis, 4,421,711., Cl. 264-529.000.

MacDonald, Angus, to Davis Instruments. Image combining sextant or the like. 4,421,407., Cl. 356-144.000.

Macdonell, Gary D.: *See*—
Louthan, Rector P.; Macdonell, Gary D.; and Lindstrom, Merlin R., 4,421,667., Cl. 252-156.000.

Machat, Jean-Yves: *See*—
Gerard, Francois; and Machat, Jean-Yves, 4,421,609., Cl. 204-16.000.

Machinefabriek G.J. Nijhuis B.V.: *See*—
Nijhuis, Gerrit J., 4,420,855., Cl. 17-1.00E.

MacKenzie, Burton T., Jr.; and Rothenberg, Sidney, to General Electric Company. Fire retarding system for polymeric compositions, and a method and products comprising the same. 4,421,890., Cl. 524-431.000.

MacMillan Bloedel Limited: *See*—
Barnes, Derek; Churchland, Mark T.; Herndier, Arnold W.; and Welsh, James K., 4,421,149., Cl. 144-366.000.

Madri, Peter: *See*—
Lloyd, Eugene A.; Madri, Peter; and Closson, William J., 4,421,665., Cl. 252-106.000.

Maehata, Hidehiko: *See*—
Kimoto, Yasuo; Yamamoto, Masahiko; Tamiya, Katsunori; Sakai, Yoshihito; Komura, Akio; Honda, Shoichi; Machata, Hidehiko; Kamada, Hiroshi; Suzaki, Tomohiko; and Inoue, Tomoya, 4,421,624., Cl. 204-209.000.

Maggelet, Charles E.: *See*—
Vranish, John M.; and Maggelet, Charles E., 4,421,205., Cl. 182-82.000.

Magic Chef, Inc.: *See*—
Maike, Bruce R.; Fladt, Carl S.; and Lavely, Frank E., 4,421,478., Cl. 431-351.000.

Magner, Bengt, to Opto-Systems Ltd. Clamp members. 4,421,434., Cl. 403-175.000.

Mahajan, Roop L.; and Ristorcelli, Joseph R., Jr., to Western Electric Co. Chemical vapor deposition reactor for silicon epitaxial processes. 4,421,786., Cl. 427-82.000.

Mahn, Gustav; Nolle, Dieter; and Eulesburg, Ulrich, to Stahlwerke Peine-Salzgitter AG. Production of steel in a basic converter employing liquid converter slag. 4,421,554., Cl. 75-52.000.

Maier, Ludwig; and Durr, Dieter, to Ciba-Geigy Corporation. Herbicidally active 2-substituted 5-penoxyphenylphosphonic acid derivatives. 4,421,548., Cl. 71-86.000.

Maike, Bruce R.; Fladt, Carl S.; and Lavely, Frank E., to Magic Chef, Inc. High efficiency fuel burner. 4,421,478., Cl. 431-351.000.

Mailander, Martin, to Deutsche Forschungs- und Vesuchsanstalt fur Luft und Raumfahrt e.V. Magnetic extinction of arcs in switches. 4,421,963., Cl. 200-147.00R.

Mains, Douglas B.; and Merte, Kenneth E., to Minnesota Mining and Manufacturing Company. Tibial osteotomy guide assembly and method. 4,421,112., Cl. 128-92.0EB.

Maisakov, Mikhail E.: *See*—
Abishev, Dzhantore N.; Malyshev, Vitaly P.; Bauer, Ivan K.; Yarygin, Vladimir A.; Maisakov, Mikhail E.; Gainutdinov, Gari-

fulla K.; Nazarov, Alexandr M.; Kusainov, Temirkhan A.; Burovoi, Isaak A.; and Omarov, Bulat N., 4,422,174., Cl. 373-115.000.

Makarov, Alexandr A.: *See—*
Mischenko, Anatoly I.; Talda, Gennady B.; Belogub, Alexandr V.; Podgorny, Anatoly N.; Makarov, Alexandr A.; Zhemerenko, Anatoly T.; Domrachev, Anatoly I.; and Efremov, Petr K., 4,421,072., Cl. 123-1.00A.

Maki, Clyde M.: *See—*
Zemke, Wayne P.; Maki, Clyde M.; and Smith, Brian J., 4,421,435., Cl. 404-113.000.

Makishima, Sadao; and Iwata, Seiichi, to Fuji Jukogyo Kabushiki Kaisha. Control mechanism for a transmission of a four-wheel drive vehicle. 4,421,335., Cl. 280-247.000.

Malacria, Max: *See—*
Bluthe, Norbert; Gore, Jacques; and Malacria, Max, 4,421,934., Cl. 568-341.000.

Malcherek, Dieter: *See—*
Freermann, Johannes; and Malcherek, Dieter, 4,421,044., Cl. 112-262.300.

Malyshev, Vitaly P.: *See—*
Abishev, Dzhantore N.; Malyshev, Vitaly P.; Bauer, Ivan K.; Yarygin, Vladimir A.; Maisakov, Mikhail E.; Gainutdinov, Garifulla K.; Nazarov, Alexandr M.; Kusainov, Temirkhan A.; Burovoi, Isaak A.; and Omarov, Bulat N., 4,422,174., Cl. 373-115.000.

Manabe, Akiyoshi: *See—*
Yamaguchi, Kenzo; Take, Yoshinari; and Manabe, Akiyoshi, 4,421,614., Cl. 204-98.000.

Manassen, Joost; Hodes, Gary; and Cahen, David, to Yeda Research and Development Co., Ltd. Storage of electrical energy with tin electrode system, storage apparatus, and method of forming such apparatus. 4,421,835., Cl. 429-111.000.

Mandel, Max, to Era Electronics (Canada) Limited. Apparatus for maintaining a diesel engine at a ready to start temperature. 4,421,075., Cl. 123-142.50R.

Mandel, Nathan: *See—*
Castellano, Thomas P.; and Mandel, Nathan, 4,421,009., Cl. 89-140.000.

Manheimer, Wallace M.; and Winsor, Niels K., to United States of America, Navy. Tokamak plasma heating with intense, pulsed ion beams. 4,421,713., Cl. 376-127.000.

Manurhin Automatic Division of Mitac, Inc.: *See—*
Leon, Theodoor P. C.; and Berns, Joseph F., Jr., 4,421,446., Cl. 414-17.000.

Marathon Oil Company: *See—*
Nagel, Walter A.; and Walsh, David J., 4,420,975., Cl. 73-155.000.

Marchman, James I.: *See—*
Estabrook, Mark R.; and Marchman, James I., 4,421,647., Cl. 210-387.000.

Marconi Company Limited, The: *See—*
Langdon, Roger M., 4,420,983., Cl. 73-861.180.

Marcus, Konrad H., to Prince Corporation. Illuminated visor assembly. 4,421,355., Cl. 296-97.00H.

Margotte, Dieter: *See—*
Eimers, Erich; Kraft, Klaus; and Margotte, Dieter, 4,421,879., Cl. 523-500.000.

Markowitz, H. Toby, to Medtronic, Inc. Heart pacemaker with separate A-V intervals for atrial synchronous and atrial-ventricular sequential pacing modes. 4,421,116., Cl. 128-419.0PG.

Marks, Burton S.; Mauri, Richard E.; and Watsey, Gazel W., to Lockheed Missiles & Space Company, Inc. Low density resin systems for improved filament-wound composites useful as rocket motor cases. 4,421,806., Cl. 428-36.000.

Marold, Ulrich, to Theodor Kromer GmbH & Co. KG. Permutation lock. 4,420,955., Cl. 70-303.00A.

Marshall, Lee. Pressure detection arrangement. 4,421,124., Cl. 128-782.000.

Marsiglio, Carl M.; and Swapceinski, John P., to Eastman Kodak Company. Periodically aligning an endless web. 4,421,228., Cl. 198-814.000.

Martel, Jacques; Tessier, Jean; and Demoute, Jean-Pierre, to Roussel Uclaf. 4-Methyl-3-formyl-pentanoic acid esters. 4,421,928., Cl. 560-177.000.

Martin, Merritt W., Jr., to R & B Machine Tool Company. Clamp for blow molding machine. 4,421,472., Cl. 425-527.000.

Martinson, William E.; and Tuchscherer, Michael A., to Steiger Tractor Inc. Overhead instrument console. 4,421,190., Cl. 180-90.000.

Maruyama, Kazushi: *See—*
Murata, Kyohei; Morise, Heiji; Yazaki, Yoichi; Maruyama, Kazushi; Nagayoshi, Haruyuki; and Kajiki, Etuji, 4,421,575., Cl. 148-153.000.

Maruyama, Shigeo: *See—*
Matsumura, Isao; Ishikawa, Yasuyuki; Hirano, Reiji; Maruyama, Shigeo; and Kohayakawa, Yoshimi, 4,421,391., Cl. 351-211.000.

Marwitz, Heinrich; Ullrich, Kurt; and Huhn, Karl, to Wacker-Chemie GmbH. Process for coating substrates. 4,421,783., Cl. 427-54.100.

Marx, Matthias: *See—*
Buthe, Ingolf; Straehle, Wolfgang; Marx, Matthias; and Peters, Reinhard, 4,421,872., Cl. 521-174.000.

Maryanoff, Bruce E.; and McComsey, David F., to McNeilab, Inc. Derivatives of 2-ureido-7-phenylhexahydrobenzo[a]quinolizines. 4,421,917., Cl. 546-95.000.

Maryland Cup Corporation: *See—*
Winstead, Thomas W., 4,421,712., Cl. 264-551.000.

Masahiro, Umeda: *See—*
Hiroshi, Yasuba; Masahiro, Umeda; and Osamu, Yuri, 4,421,837., Cl. 430-31.000.

Maschinenfabrik Benninger AG: *See—*
Kofler, Wilhelm, 4,420,861., Cl. 28-196.000.

Maschinenfabrik Gehring Gesellschaft mit beschrankter Haftung & Co. Kommanditgesellschaft: *See—*
Gehring, Heinz, 4,420,912., Cl. 51-227.00R.

Massachusetts General Hospital, The: *See—*
Haber, Edgar; and Khaw, Ban A., 4,421,735., Cl. 424-1.100.

Massachusetts Institute of Technology: *See—*
Leonberger, Frederick J.; Melngailis, Ivars; Bozler, Carl O.; and McClelland, Robert W., 4,420,873., Cl. 29-576.00E.
Pratt, George W., Jr., 4,421,119., Cl. 128-660.000.

Massey, Lester G.; George, David A.; Brabets, Robert I.; and Abel, William A., to CNG Research Company. Adiabatic expansion orifice assembly for passing a slurry from a high pressure region to a low pressure region. 4,421,722., Cl. 422-129.000.

Massey, Steven R., to Gulf & Western Manufacturing Company. Closure assembly. 4,421,245., Cl. 220-328.000.

Masters, Adrian G.; and Munden, Jeffery E., to United Biscuits (UK) Limited. Radiant heat cooking apparatus. 4,421,015., Cl. 99-332.000.

Masters, William E. Waterproof bag device for articles. 4,421,150., Cl. 383-61.000.

Mastronardi, Richard; DeCew, Alan; and McMahon, David, to American Science and Engineering, Inc. CT Slice proximity rotary table and elevator for examining large objects. 4,422,177., Cl. 378-17.000.

Matano, Tetsuya: *See—*
Shibata, Takuo; Izuta, Mitsugu; and Matano, Tetsuya, 4,421,187., Cl. 180-73.00D.

Mathews, Michael: *See—*
Price, Keith; and Mathews, Michael, 4,421,424., Cl. 374-48.000.

Mathieu, Michel: *See—*
Genzling, Claude; and Mathieu, Michel, 4,420,843., Cl. 2-161.00A.

Mathis, Ronald D., to Phillips Petroleum Company. Polymer stabilization. 4,421,910., Cl. 528-388.000.

Matschinsky, Wolfgang: *See—*
Kosak, Werner; and Matschinsky, Wolfgang, 4,421,332., Cl. 280-95.00R.

Matsubara, Hideyuki; Kosugi, Ikutaka; and Tsukamoto, Chiaki, to Toyo Rubber Industry Company, Limited, The. Corrosion resistant tire rim. 4,421,821., Cl. 428-323.000.

Matsuda, Gunji: *See—*
Mori, Fumio; Itsubo, Junichi; Oda, Hiroyuki; and Matsuda, Gunji, 4,421,804., Cl. 428-35.000.

Matsuhisa, Tadaaki: *See—*
Oda, Isao; and Matsuhisa, Tadaaki, 4,421,702., Cl. 264-62.000.

Matsui, Takahiro, to Kabushiki Kaisha Morita Seisakusho. Drive control circuit for dental treatment table. 4,420,936., Cl. 60-431.000.

Matsui, Takahiro; and Tamura, Jun, to Kabushiki Kaisha Morita Seisakusho. Air-operated oil pressure control valve. 4,421,292., Cl. 251-60.000.

Matsumoto, Ikuo: *See—*
Hidaka, Hiroyoshi; Matsumoto, Ikuo; Yoshizawa, Junji; and Kotani, Shigenori, 4,421,754., Cl. 424-250.000.

Matsumoto, Jun: *See—*
Mori, Hiromichi; Matsumoto, Jun; and Fujioka, Masanobu, 4,421,955., Cl. 179-18.0EA.

Matsumoto, Norio; and Umehara, Teruo, to Hitachi Metals, Ltd. D.C. Electromagnetic actuator. 4,422,060., Cl. 335-256.000.

Matsumoto, Yoshikane; Kobayashi, Tsuneki; Kurosawa, Makoto; and Seino, Minoru, to Hitachi Koki Company, Limited. Dot printer. 4,421,430., Cl. 400-121.000.

Matsumura, Isao; Ishikawa, Yasuyuki; Hirano, Reiji; Maruyama, Shigeo; and Kohayakawa, Yoshimi, to Canon Kabushiki Kaisha. Auto eye-refractometer. 4,421,391., Cl. 351-211.000.

Matsunari, Fumio: *See—*
Futamura, Yoshisumi; Komeiji, Shigeki; Noro, Shuhei; Hasegawa, Junzo; Matsunari, Fumio; and Ikeda, Toshiaki, 4,421,494., Cl. 464-111.000.

Matsuno, Tatsuji; and Nomura, Yosio, to Toyo Sushinki Kabushiki Kaisha. Method for measuring insulation resistance and device therefor. 4,422,034., Cl. 324-51.000.

Matsushimakogyo Kabushiki Kaisha: *See—*
Fujii, Hiroyuki; Shimakawa, Joji; Hara, Yukio; and Kobayashi, Masatoshi, 4,421,621., Cl. 204-192.00C.

Matsushita Electric Industrial Co., Ltd.: *See—*
Adachi, Kinichi; Shimoda, Hisanori; Hirata, Yasushi; and Ohmukai, Yoshimi, 4,421,477., Cl. 431-325.000.
Fuji, Tsuneharu; Tsumura, Masakatsu; and Ishikawa, Takayoshi, 4,422,059., Cl. 333-202.000.
Hiroshi, Yasuba; Masahiro, Umeda; and Osamu, Yuri, 4,421,837., Cl. 430-31.000.
Miura, Masayoshi; Oda, Gen; Akami, Kenji; and Naito, Hiroshi, 4,422,086., Cl. 346-140.00R.
Nomura, Noboru; Kanai, Kenji; Kaminaka, Nobuyuki; and Nouchi, Norimoto, 4,422,117., Cl. 360-126.000.

Matsushita Electric Works, Ltd.: *See—*
Kakumoto, Hiromi; and Furukawa, Kaoru, 4,422,032., Cl. 320-39.000.

Matsuzaki, Minoru, to Olympus Optical Company Ltd. Focussing apparatus for camera. 4,421,396., Cl. 354-25.000.

Mattel, Inc.: *See—*
Chang, Richard S.; and Chodak, Jan B., 4,421,313., Cl. 273-237.000.

Matthews, J. David, to Atlantic Richfield Company. Reducing the tendency of dried coal to spontaneously ignite. 4,421,520., Cl. 44-6.000.

Mauri, Richard E.: *See—*
Marks, Burton S.; Mauri, Richard E.; and Watsey, Gazel W., 4,421,806., Cl. 428-36.000.
Mavilor Systemes: *See—*
Coquillart, Michel, 4,420,875., Cl. 29-597.000.
Max-Planck-Gesellschaft zur Fuerderung der Wissenschaften e.v.: *See—*
Claussen, Nils; Petzow, Gunter; and Brook, Richard J., 4,421,861., Cl. 501-103.000.
Mayers, John L.: *See—*
Mendez, Juan A.; and Mayers, John L., 4,420,932., Cl. 60-230.000.
McAllise, Raymond J. A.C. Motor control. 4,422,030., Cl. 318-779.000.
McAloon, Kevin: *See—*
Briggs, Peter J.; and McAloon, Kevin, 4,421,815., Cl. 428-198.000.
McBride, Donald G., to International Business Machines Corporation. Method for stripping peel apart conductive structures. 4,421,608., Cl. 204-12.000.
McCamy, Calvin S., to Kollmorgen Technologies Corporation. Annular illuminator. 4,422,135., Cl. 362-346.000.
McCarn, Ellen D., to McCarn Enterprises, Inc. Display and storage package for an elongated flat article. 4,421,231., Cl. 206-388.000.
McCarn Enterprises, Inc.: *See—*
McCarn, Ellen D., 4,421,231., Cl. 206-388.000.
McCleerey, Earl W.: *See—*
Cosmos, Pete; and McCleerey, Earl W., 4,421,376., Cl. 339-103.00M.
McClelland, Robert W.: *See—*
Leonberger, Frederick J.; Melngailis, Ivars; Bozler, Carl O.; and McClelland, Robert W., 4,420,873., Cl. 29-576.00E.
McComsey, David F.: *See—*
Maryanoff, Bruce E.; and McComsey, David F., 4,421,917., Cl. 546-95.000.
McCue, James H. Solar building construction. 4,420,939., Cl. 60-641.120.
McCullagh, Morris B.: *See—*
Trimmer, Raymond W.; and McCullagh, Morris B., 4,420,863., Cl. 29-121.500.
McCullion, Francis E., Jr., to Cymaticolor Corporation. Process color offset printing duplicator. 4,421,026., Cl. 101-136.000.
McDermott, Arthur W., to Boeing Company, The. Method of coil assembly for hot melt induction heater apparatus. 4,420,876., Cl. 29-611.000.
McDonald, Ian A.: *See—*
Palfreyman, Michael G.; and McDonald, Ian A., 4,421,767., Cl. 424-319.000.
McDonald, Ray S.: *See—*
Berkovits, Barouh V.; and McDonald, Ray S., 4,421,114., Cl. 128-419.0PG.
McDonnell Douglas Corporation: *See—*
Forys, Edward L., 4,421,997., Cl. 310-12.000.
Orloff, Eugene F.; Horowitz, Martin; and Ritter, Charles H., 4,420,976., Cl. 73-304.00C.
McEwen, Stephen N.; Stevens, Robert L.; and Benschoter, Barry R., to Henry Filters, Inc. Trough manufacturing process. 4,420,868., Cl. 29-460.000.
McEwen, Stephen N.: *See—*
Creps, John L.; Fox, Robert J.; Guelde, Ted W.; Harms, Eugene H.; and McEwen, Stephen N., 4,421,645., Cl. 210-260.000.
McFadden, Lewis W.: *See—*
Poad, William J.; De Santis, Urbano J.; and McFadden, Lewis W., 4,421,542., Cl. 65-158.000.
McFiggans, Robert B.: *See—*
Soderberg, John H.; Eckert, Alton B.; and McFiggans, Robert B., 4,422,148., Cl. 364-464.000.
McGean-Rohco, Inc.: *See—*
Cameron, James C., 4,421,611., Cl. 204-43.00T.
McGovern, Stephen J.: *See—*
Dolan, Michael J.; McGovern, Stephen J.; and Owens, Peter J., 4,421,636., Cl. 208-113.000.
McGraw-Edison Company: *See—*
Watts, Thomas E., 4,422,137., Cl. 362-390.000.
McGrew, Stephen P. Full-color hologram. 4,421,380., Cl. 350-3.780.
McKay, Curtis J.: *See—*
Hoehn, Ernst; McKay, Curtis J.; and Murray, E. Donald, 4,421,852., Cl. 435-99.000.
McKee, Graham E.; Brandstetter, Franz; Echte, Adolf; Hambrecht, Juergen; Overhoff, Heinz-Juergen; Priebe, Edmund; Schwaab, Josef; and Siebel, Peter, to BASF Aktiengesellschaft. Process for the manufacture of impact resistant thermoplastic molding materials. 4,421,875., Cl. 523-335.000.
McKenna, Peter G.: *See—*
Hill, Walter A.; Stevenson, Andrew C.; and McKenna, Peter G., 4,422,022., Cl. 318-376.000.
McKenzie, Joseph A., Jr. Self-masking socket pin carrier for printed circuit boards. 4,420,877., Cl. 29-739.000.
McKinney, Charles D., III, to Owens-Corning Fiberglas Corporation. Apparatus for forming and packaging multistrand roving. 4,421,282., Cl. 242-18.00G.
McLaughlin, Owen L. Wave powered electrical generator. 4,421,991., Cl. 290-53.000.
McMahan, Michael E., to Halliburton Company. Drill pipe tester and safety valve. 4,421,172., Cl. 166-334.000.
McMahon, David: *See—*
Mastronardi, Richard; DeCew, Alan; and McMahon, David, 4,422,177., Cl. 378-17.000.
McMahon, Donald H., to Sperry Corporation. Fiber optic transducer. 4,421,384., Cl. 350-96.290.
McMaster, Ronald A. Conveyor roll for conveying heated glass sheets. 4,421,482., Cl. 432-246.000.
McNeilab, Inc.: *See—*
Maryanoff, Bruce E.; and McComsey, David F., 4,421,917., Cl. 546-95.000.
McQuade, Thomas F. Fluid delivery monitor. 4,421,417., Cl. 368-65.000.
McStravick, David M.; and Akkerman, Neil H., to Baker International Corporation. Cyclic annulus pressure controlled oil well flow valve and method. 4,421,174., Cl. 166-374.000.
Mead Corporation, The: *See—*
DuVall, Dale R.; and Kockler, Barry C., 4,422,100., Cl. 358-293.000.
Meador, Richard A., to Texaco Development Corporation. Electromagnetic wave logging dipmeter. 4,422,043., Cl. 324-338.000.
Measurex Corporation: *See—*
Aral, Gurcan, 4,421,068., Cl. 122-448.00B.
Meckler, Milton. Solar lighting space and water heating system. 4,421,097., Cl. 126-422.000.
Medical Valve Corporation: *See—*
Stephens, James W., 4,421,296., Cl. 251-149.700.
Medtronic, Inc.: *See—*
Markowitz, H. Toby, 4,421,116., Cl. 128-419.0PG.
Meguro, Shinichiro: *See—*
Furuto, Yoshio; Meguro, Shinichiro; Suzuki, Takuya; Ito, Ikuo; Ando, Toshinari; Nishi, Masataka; and Shimamoto, Susumu, 4,421,946., Cl. 174-128.00S.
Mehra, Yuv R., to El Paso Hydrocarbons Company. Process for recovery of natural gas liquids from a sweetened natural gas stream. 4,421,535., Cl. 62-17.000.
Mehta, Aspy K., to Union Carbide Corporation. Electrically conductive compositions comprising an ethylene polymer, a mineral filler and an oiled, electrically conductive carbon black. 4,421,678., Cl. 252-511.000.
Mehta, Gautam I.; and Rogers, Lynn M., to United States of America, Energy. Control of bed height in a fluidized bed gasification system. 4,421,523., Cl. 48-197.00R.
Mejdell, Glor T.: *See—*
Giskehaug, Karl J.; Loiten, Kjell O.; and Mejdell, Glor T., 4,421,649., Cl. 210-634.000.
Melamine Chemicals, Inc.: *See—*
Crews, George M., 4,421,545., Cl. 71-30.000.
Meleshko, Vyacheslav J.: *See—*
Bildjukevich, Viktor L.; Turovsky, Leonid N.; Meleshko, Vyacheslav J.; Yakimovich, Dmitry T.; Lebedkova, Valentina A.; Demidovich, Boris K.; Plavnik, Gennady Z.; Dubrovsky, Nikolai N.; Proskalovich, Evgeny A.; and Privovarov, Alexandr I., 4,421,594., Cl. 159-4.00R.
Melngailis, Ivars: *See—*
Leonberger, Frederick J.; Melngailis, Ivars; Bozler, Carl O.; and McClelland, Robert W., 4,420,873., Cl. 29-576.00E.
Mendez, Juan A.; and Mayers, John L., to United States of America, Air Force. Pressure control system for convergent-divergent exhaust nozzle. 4,420,932., Cl. 60-230.000.
Mergey, Claude: *See—*
Alloue, Raymond; and Mergey, Claude, 4,421,828., Cl. 428-629.000.
Merli, Sergio: *See—*
Cassinelli, Giuseppe; Grein, Arpad; Merli, Sergio; and Rivola, Giovanni, 4,421,851., Cl. 435-78.000.
Merrel Dow Pharmaceuticals Inc.: *See—*
Walters, Eugene L., 4,421,736., Cl. 424-19.000.
Merrell Toraude et Compagnie: *See—*
Casara, Patrick; and Danzin, Charles, 4,421,768., Cl. 424-325.000.
Palfreyman, Michael G.; and McDonald, Ian A., 4,421,767., Cl. 424-319.000.
Merte, Kenneth E.: *See—*
Mains, Douglas B.; and Merte, Kenneth E., 4,421,112., Cl. 128-92.0EB.
Meschi, Luciano, to Wully S.A. Apparatus for the splicing of sheet material, particularly for the continuous feeding of fast printing machines. 4,421,590., Cl. 156-506.000.
Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung: *See—*
Rudolf, Karl; and Hessberg, Helmut, 4,421,032., Cl. 102-307.000.
Wendt, Hans J., 4,422,180., Cl. 455-603.000.
Meta, Frank. Multifunction solar window and venetian blind. 4,421,098., Cl. 126-429.000.
Metallwerk Max Brose GmbH & Co.: *See—*
Hess, Hans-Peter, 4,421,299., Cl. 254-342.000.
Metco, Inc.: *See—*
Novinski, Edward R., 4,421,799., Cl. 427-423.000.
Metropolitan Furniture Corp.: *See—*
Brass, John R., 4,422,134., Cl. 362-300.000.
Mettler Instrumente A.G.: *See—*
Zulliger, Hans R., 4,420,984., Cl. 73-862.590.
Metz, Paul; Legille, Edouard; Schleimer, Francois; and Weiner, Antoine, to Arbed S.A. Method of and apparatus for metallurgical treatment of a melt. 4,421,555., Cl. 75-53.000.
Metzeler Schaum GmbH: *See—*
Bokelmann, Horst, 4,421,468., Cl. 425-143.000.
Meyer, Stanley A. Hydrogen gas burner. 4,421,474., Cl. 431-115.000.

Meyer, Walter E.: *See—*
Tomcufcik, Andrew S.; Meyer, Walter E.; and Dusza, John P., 4,421,753., Cl. 424-250.000.

Meyer, William W., to Tektronix, Inc. Apparatus for providing vertical as well as horizontal smoothing of convergence correction signals in a digital convergence system. 4,422,019., Cl. 315-368.000.

Meyerle, Michael, to Zahnradfabrik Friedrichshafen, AG. Drive system for track-laying vehicle. 4,420,991., Cl. 74-682.000.

Meyers, Paul F.: *See—*
Dow, Julian; and Meyers, Paul F., 4,421,118., Cl. 128-660.000.

Michael, Jan D. Work piece holder assembly. 4,420,911., Cl. 51-216.00R.

Michals, Richard A.; Mozer, Frank H.; and Zum Bahlen, Ralph E., to Stenograph Corporation. Shorthand machine having electric platen advancement. 4,421,427., Cl. 400-94.000.

Michel, Alfred: *See—*
Gulden, Peter; Michel, Alfred; and Kostka, Hana, 4,421,476., Cl. 431-243.000.

Michel, Bernard: *See—*
Arnoux, Daniel; Leconte, Andre; Genter, Claude; and Michel, Bernard, 4,420,918., Cl. 52-157.000.

Michelet, Daniel: *See—*
Baudouin, Michel; and Michelet, Daniel, 4,421,920., Cl. 546-163.000.

Michelet, Jacques: *See—*
Boulogne, Jean; Hochmann, Tibaud; Michelet, Jacques; and Morane, Bruno, 4,421,128., Cl. 132-88.500.

Microcpolis Corporation: *See—*
Mabon, Stuart P., 4,422,113., Cl. 360-78.000.

Midland-Ross Corporation: *See—*
Kurple, William M., 4,422,016., Cl. 315-241.00S.

Mielke, Robert W., to Western Electric Company, Inc. Device for extracting an in-line array of socket-mounted circuit packages of the dual-in-line-type. 4,420,880., Cl. 29-764.000.

Mihashi, Hiroshi: *See—*
Taguchi, Kiyomi; Terada, Osamu; Morishita, Noriaki; Mihashi, Hiroshi; and Nagai, Seiji, 4,421,697., Cl. 264-30.000.

Mikuni Kogyo Co., Ltd.: *See—*
Tominari, Noboru; and Kamiyama, Shuichi, 4,422,123., Cl. 361-152.000.

Miller, Frank N.: *See—*
Gilman, Thomas; and Miller, Frank N., 4,420,853., Cl. 15-111.000.

Miller, Franklyn D.: *See—*
Muller, Werner C.; and Miller, Franklyn D., 4,421,856., Cl. 435-161.000.

Miller, Helmut: *See—*
Heuss, Valentin; and Miller, Helmut, 4,421,990., Cl. 290-53.000.

Miller, Norvel L. Variable frequency vacuum actuated seismic energy source. 4,421,198., Cl. 181-121.000.

Miller, Raimund; and Tenud, Leander, to Lonza Ltd. Process for the production of tetronic acid. 4,421,922., Cl. 549-313.000.

Milliken Research Corporation: *See—*
Tien-Kuei, Su, 4,421,513., Cl. 8-130.100.

Milstein, Donald: *See—*
Shih, Stuart S.; and Milstein, Donald, 4,421,633., Cl. 208-59.000.

Mimamida, Isao: *See—*
Numata, Mitsuo; Mimamida, Isao; Yamaoka, Masayoshi; Shiraishi, Mitsuru; and Miyawaki, Toshio, 4,421,912., Cl. 544-27.000.

Ministry of International Trade & Industry: *See—*
Osumi, Yasuaki; Suzuki, Hiroshi; Kato, Akihiko; and Oguro, Keisuke, 4,421,718., Cl. 420-443.000.

Minner, Willy; Bohme, Rolf; Siegle, Martin; and Rinderle, Heinz, to Licentia Patent-Verwaltungs-GmbH. Temperature-stabilized voltage source. 4,422,033., Cl. 323-314.000.

Minnesota Mining and Manufacturing Company: *See—*
Burleigh, Malcolm B., 4,421,719., Cl. 422-57.000.
Levens, Dennis L., 4,421,822., Cl. 428-343.000.
Mains, Douglas B.; and Merte, Kenneth E., 4,421,112., Cl. 128-92.0EB.
Moeller, Gary D.; and Wolff, Robert E., 4,422,111., Cl. 360-72.100.

Misawa Home Co., Ltd.: *See—*
Kataishi, Takao; and Yokoi, Nobufumi, 4,421,130., Cl. 134-76.000.

Mischenko, Anatoly I.; Talda, Gennady B.; Belogub, Alexandr V.; Podgorny, Anatoly N.; Makarov, Alexandr A.; Zhemerenko, Anatoly T.; Domrachev, Anatoly I.; and Efremov, Petr K. Method of feeding carburetor internal combustion engine. 4,421,072., Cl. 123-1.00A.

Mita, Satoshi; Tanaka, Kouichi; Nakano, Yoshitomo; Saita, Harumi; and Nakayama, Akira, to Sony Corporation. Automatic telephone answering and message recording device. 4,421,954., Cl. 179-6.130.

Mitsubishi Chemical Industries Limited: *See—*
Shimizu, Shigeki; and Oshima, Akinobu, 4,421,841., Cl. 430-285.000.

Mitsubishi Denki Kabushiki Kaisha: *See—*
Morita, Minoru, 4,421,046., Cl. 112-292.000.
Ukai, Jun; Tetsu, Toyozo; and Shamoto, Kunio, 4,421,971., Cl. 219-128.000.
Yamamoto, Sakuei; Inao, Hiroshi; Tokumitsu, Kiyonori; Nishida, Mitsuhiro; and Kumamoto, Sadahiro, 4,421,324., Cl. 277-24.000.
Yoshino, Hozo, 4,420,947., Cl. 62-160.000.

Mitsubishi Gas Chemical Co. Inc.: *See—*
Moriya, Takehiko, 4,421,235., Cl. 206-524.200.

Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Hirakawa, Tadashi; Kusubayashi, Toshiaki; and Oku, Yukio, 4,420,999., Cl. 83-345.000.

Mitsubishi Rayon Co., Ltd.: *See—*
Kitagawa, Hiroshi; Sato, Masaaki; and Shuto, Shoji, 4,421,584., Cl. 156-178.000.

Mitsuoka, Toshihiro; and Seki, Shojiro, to Nissan Motor Company, Limited. Automotive door side molding structure. 4,421,802., Cl. 428-31.000.

Mitutoyo Mfg. Co., Ltd.: *See—*
Sakata, Hideo; Mizuno, Ichiro; Nakahara, Masao; and Sanpei, Takasi, 4,420,887., Cl. 33-147.00F.
Wakao, Masato; and Sugizaki, Iwao, 4,420,888., Cl. 33-172.00R.

Miura, Masayoshi; Oda, Gen; Akami, Kenji; and Naito, Hiroshi, to Matsushita Electric Industrial Company, Limited. Device for feeding constant pressure fluid. 4,422,086., Cl. 346-140.00R.

Miyagawa, Hiroshi: *See—*
Sakuma, Shinzo; Yanagisawa, Hifumi; Tokuhata, Kazuo; and Miyagawa, Hiroshi, 4,421,961., Cl. 200-144.00B.

Miyagi, Hideo: *See—*
Nagase, Masaomi; and Miyagi, Hideo, 4,421,085., Cl. 123-416.000.

Miyahara, Masahiko: *See—*
Nagai, Shigeki; Yorie, Takashi; Sugiura, Hisao; Hibi, Toru; Sato, Katsumi; Wada, Takuo; and Miyahara, Masahiko, 4,421,761., Cl. 424-275.000.

Miyajiri, Tetsuo: *See—*
Nakahara, Motohiro; Miyajiri, Tetsuo; Yoshioka, Naoki; and Kuwahara, Toru, 4,421,540., Cl. 65-3.120.

Miyake, Hiroyuki: *See—*
Kagiura, Kazuo; Miyake, Hiroyuki; Kasama, Nobuhiro; Sagara, Seiji; Sasaki, Nobukazu; and Yonemori, Takaji, 4,421,401., Cl. 355-3.0FU.

Miyake, Itsuo; Okamoto, Keizo; Bundo, Motonori; and Noda, Akihiro, to Bridgestone Tire Company Limited. Bead filler rubber composition. 4,421,891., Cl. 524-495.000.

Miyamoto, Koichi: *See—*
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,421,402., Cl. 355-8.000.

Miyashita, Hideo: *See—*
Inaba, Hajimu; Miyashita, Hideo; and Otsuka, Shoichi, 4,422,142., Cl. 364-200.000.

Miyawaki, Toshio: *See—*
Numata, Mitsuo; Mimamida, Isao; Yamaoka, Masayoshi; Shiraishi, Mitsuru; and Miyawaki, Toshio, 4,421,912., Cl. 544-27.000.

Mizukura, Noboru: *See—*
Ikeuchi, Satoru; Kanbe, Masaru; Takahashi, Jiro; Kobayashi, Ryuichiro; Suginaka, Shunji; and Mizukura, Noboru, 4,421,846., Cl. 430-559.000.

Mizuno, Ichiro: *See—*
Sakata, Hideo; Mizuno, Ichiro; Nakahara, Masao; and Sanpei, Takasi, 4,420,887., Cl. 33-147.00F.

Mizutani, Hidemasa: *See—*
Suzuki, Takashi; Iizuka, Kiyoshi; Ohtaka, Keiji; and Mizutani, Hidemasa, 4,421,398., Cl. 354-200.000.

Mobil Oil Corporation: *See—*
Bowden, Edgar A.; Deline, Gordon R.; and Koeijmans, Gerard D., 4,422,164., Cl. 367-15.000.
Dolan, Michael J.; McGovern, Stephen J.; and Owens, Peter J., 4,421,636., Cl. 208-113.000.
Herrington, Fox J., 4,421,465., Cl. 425-133.100.
Horodysky, Andrew G.; and Kaminski, Joan M., 4,421,659., Cl. 252-33.000.
Hurd, Billy G., 4,421,168., Cl. 166-273.000.
Olson, David H.; and Rodewald, Paul G., 4,421,941., Cl. 585-467.000.
Prader, Randolph D., 4,421,805., Cl. 428-35.000.
Shih, Stuart S.; and Milstein, Donald, 4,421,633., Cl. 208-59.000.
Thomas, Stephen W.; and Otis, Robert M., 4,422,165., Cl. 367-40.000.

Mochida Seiyaku Kabushiki Kaisha: *See—*
Jinbo, Susumu; Kohno, Shoichi; and Kashima, Koichi, 4,421,919., Cl. 546-159.000.

Moeller, Gary D.; and Wolff, Robert E., to Minnesota Mining and Manufacturing Company. High capacity data cartridge system and preformatted cartridge for use therein. 4,422,111., Cl. 360-72.100.

Mohlere, Richard D., to United States of America, Army. Linear motor controller. 4,422,027., Cl. 318-687.000.

Moisson, Marc F., to N.V. Raychem S.A. Junction assembly. 4,421,945., Cl. 174-92.000.

Molins, Desmond W.; Hinchcliffe, Dennis; and Clarke, Peter A., to Molins Limited. Conveyor systems for cigarettes and other rod-like articles. 4,421,223., Cl. 198-604.000.

Molins Limited: *See—*
Arthur, Hugh M.; and Labbe, Francis A. M., 4,421,055., Cl. 118-620.000.
Molins, Desmond W.; Hinchcliffe, Dennis; and Clarke, Peter A., 4,421,223., Cl. 198-604.000.

Moll, Manfred; Delorme, Jean J.; and Weber, Jean C. Apparatus for continuously measuring cells or particles in suspension in a liquid medium. 4,422,036., Cl. 324-71.400.

Molzahn, Marcelle G.: *See—*
Haluska, Loren A.; and Molzahn, Marcelle G., 4,421,893., Cl. 524-588.000.

Momii, Isao; Chubachi, Noriyoshi; and Kushibiki, Junichi, to Olympus Optical Company Ltd. Ultrasonic microscope. 4,420,979., Cl. 73-644.000.

Monma, Hideo; Takahashi, Masayuki; and Ishiguro, Masato, to Fujitsu Limited. Integrated circuit with frequency-dividing circuits capable of being tested at a high speed. 4,422,038., Cl. 324-73.00R.
Monsanto Company: *See*—
Franz, John E.; and Kaufman, Robert J., 4,421,549., Cl. 71-87.000.
Lynch, Dan K., 4,421,937., Cl. 568-708.000.
Van Dyke, James R., 4,421,333., Cl. 280-154.50R.
Monsanto Europe S.A.: *See*—
Price, Keith; and Mathews, Michael, 4,421,424., Cl. 374-48.000.
Montgomery, Anthony J.: *See*—
Goodridge, Francis; Montgomery, Anthony J.; and Wright, Alan R., 4,421,613., Cl. 204-74.000.
Montilla, Lino M., Jr.; and Uchuck, Alexander, to Western Electric Company, Inc. Trifurcated insulation-penetrating terminal. 4,421,374., Cl. 339-97.00P.
Montres Rado S.A.: *See*—
Lederrey, Marc, 4,421,423., Cl. 368-291.000.
Montress, Gary K.: *See*—
Cullen, Donald E.; Montress, Gary K.; Gilden, Meyer; and Wagner, Robert A., 4,422,055., Cl. 333-151.000.
Moody, Arlin R.; and Moody, Bobby J. Combination clean-out and drilling tool. 4,421,182., Cl. 175-65.000.
Moody, Bobby J.: *See*—
Moody, Arlin R.; and Moody, Bobby J., 4,421,182., Cl. 175-65.000.
Moore, Henry P.: *See*—
Hocking, Paul R.; Straight, Jay G.; and Moore, Henry P., 4,421,019., Cl. 99-450.400.
Moore, Larry E. Back washing device. 4,420,850., Cl. 15-21.00R.
Moore, Robert G., Jr., to Bendix Corporation, The. Fuel metering apparatus. 4,421,089., Cl. 123-454.000.
Morane, Bruno: *See*—
Boulogne, Jean; Hochmann, Tibaud; Michelet, Jacques; and Morane, Bruno, 4,421,128., Cl. 132-88.500.
Morgan, Jeff D.: *See*—
Lee, Bert, 4,421,463., Cl. 417-383.000.
Morgan, Michael J.: *See*—
Fiorucci, Louis C.; and Morgan, Michael J., 4,421,662., Cl. 252-70.000.
Mori, Fumio; Itsubo, Junichi; Oda, Hiroyuki; and Matsuda, Gunji, to Japan Crown Cork Co., Ltd. Bottle for carbonated drink. 4,421,804., Cl. 428-35.000.
Mori, Hiromichi; Matsumoto, Jun; and Fujioka, Masanobu, to Kokusai Denshin Denwa Kabushiki Kaisha. Distributed switching system. 4,421,955., Cl. 179-18.0EA.
Mori, Tatsuo; and Ishii, Juichi, to Nippon Sanso K.K. Process for producing krypton and xenon. 4,421,536., Cl. 62-18.000.
Mori, Toshihiro, to Nippon Electric Co., Ltd. Radio communication receiver having an oscillator circuit of lower power-consumption. 4,422,178., Cl. 455-343.000.
Morichika, Toshiaki; Sugitani, Junichi; and Kobayashi, Takao, to Kubota Ltd. Iron-based heat-resistant cast alloy. 4,421,558., Cl. 75-128.00E.
Morisawa, Yasuhiro; Konishi, Kiyoshi; and Kataoka, Mitsuru, to Sankyo Co., Ltd. Method of preserving organic materials from fungal attack and a composition for use in such a method. 4,421,766., Cl. 424-311.000.
Morise, Heiji: *See*—
Murata, Kyohei; Morise, Heiji; Yazaki, Yoichi; Maruyama, Kazushi; Nagayoshi, Haruyuki; and Kajiki, Etuji, 4,421,575., Cl. 148-153.000.
Morishige, Morio; and Sone, Hironao, to Casio Computer Co., Ltd. Electronic timepiece. 4,421,419., Cl. 368-73.000.
Morishima, Hideki, to Rhythm Watch Co., Ltd. Clock adjustment switch system. 4,421,418., Cl. 368-69.000.
Morishita, Noriaki: *See*—
Taguchi, Kiyomi; Terada, Osamu; Morishita, Noriaki; Mihashi, Hiroshi; and Nagai, Seiji, 4,421,697., Cl. 264-30.000.
Morita, Akitaka: *See*—
Hashimoto, Shintaro; Morita, Akitaka; and Tsuda, Hiroshi, 4,421,416., Cl. 368-63.000.
Morita, Minoru, to Mitsubishi Denki Kabushiki Kaisha. Thread cutter assembly in sewing machine. 4,421,046., Cl. 112-292.000.
Morita, Shinzo: *See*—
Hattori, Shuzo; Morita, Shinzo; and Fujii, Tsuneo, 4,421,842., Cl. 430-296.000.
Hattori, Shuzo; Morita, Shinzo; and Fujii, Tsuneo, 4,421,843., Cl. 430-322.000.
Moriya, Takehiko, to Mitsubishi Gas Chemical Co. Inc. Oxygen absorbent-containing bag and container sealing member having the same. 4,421,235., Cl. 206-524.200.
Moriyama, Satoru: *See*—
Ishikawa, Hiromichi; Kitaori, Kazuhiko; Kaneko, Kimiyoshi; Moriyama, Satoru; Kobayashi, Takashi; and Uchiyama, Tsugio, 4,421,750., Cl. 424-207.000.
Morley, James P.; and Olsson, Burton K. Heavy duty end face seal with asymmetrical cross-section. 4,421,327., Cl. 277-84.000.
Moroishi, Taishi: *See*—
Kudo, Takeo; Okada, Yasutaka; Moroishi, Taishi; Ikeda, Akio; Ohtani, Hiroo; and Yoshikawa, Kunihiko, 4,421,571., Cl. 148-11.50R.
Moroni, Ermes, to Hodigal s.a.s. di Luciano Moroni. Selective galvanizing process using a calcium carbonate masking composition. 4,421,793., Cl. 427-272.000.
Morris, Norman: *See*—
Emerson, Reginald S.; and Morris, Norman, 4,421,496., Cl. 464-95.000.
Moseley, Charles R.: *See*—
Aldred, Fred C.; and Moseley, Charles R., 4,421,583., Cl. 156-167.000.
Moser, Theo, to Robert Bosch GmbH. Method and apparatus for combined guidance, incorporating a register, of two continuously advanced foil strips. 4,420,923., Cl. 53-51.000.
Moses, John R. Flat emergency exit sign utilizing an electro-illuminescent lamp. 4,420,898., Cl. 40-570.000.
Motorola, Inc.: *See*—
Barnes, Michael F., 4,421,952., Cl. 179-2.0EA.
Davis, Walter L.; and Kraul, Douglas R., 4,422,162., Cl. 365-227.000.
Vizmuller, Peter, 4,422,058., Cl. 333-202.000.
Motoyama, Kazuyasu, to Olympus Optical Company Ltd. Tape recorder control system for automatically reversing tape. 4,422,107., Cl. 360-62.000.
Moulton, David R.: *See*—
Ferralli, Michael W.; and Moulton, David R., 4,421,200., Cl. 181-144.000.
Moyer, Ross A.: *See*—
Duncan, John R.; Rohrberg, Roderick G.; Moyer, Ross A.; and Wright, William E., Sr., 4,421,972., Cl. 219-137.0PS.
Mozer, Frank H.: *See*—
Michals, Richard A.; Mozer, Frank H.; and Zum Bahlen, Ralph E., 4,421,427., Cl. 400-94.000.
MTD Products Inc.: *See*—
Hauser, Hans, 4,420,990., Cl. 74-606.00R.
Mucha, Horst: *See*—
Reinmold, Heinz-Josef; Mucha, Horst; and Arnoldi, Wilhelm, 4,422,149., Cl. 364-473.000.
Mucheyer, Norbert; and Schulte, Heinz, to G. L. Rexroth GmbH. Control circuit throttling valve. 4,421,012., Cl. 91-388.000.
Mueller, Hans: *See*—
Brunnmueller, Fritz; Schneider, Rolf; Kroener, Michael; Mueller, Hans; and Linhart, Friedrich, 4,421,602., Cl. 162-168.200.
Mueller, Richard A., to Cities Service Company. Apparatus and process for selectively expanding to join one tube into another tube. 4,420,866., Cl. 29-421.00R.
Mueller, Richard H.; Cimarusti, Christopher M.; and Kissick, Thomas P., to E. R. Squibb & Sons, Inc. 4-Norbornyl-sulfonyl azetidinone intermediates and process for preparing (S)-3-acylamino-4-substituted-2-azetidinones. 4,421,686., Cl. 260-239.00A.
Mueller, Theodore R., to United States of America, Energy. High precision triangular waveform generator. 4,422,044., Cl. 328-181.000.
Mueller, Udo, to Norsk Hydro a.s. Process for preparing rotund particles of salt-coated magnesium or magnesium alloy. 4,421,551., Cl. 75-0.50B.
Muka, Richard S., to Eastman Kodak Company. Document feeder with improved vacuum system. 4,421,306., Cl. 271-5.000.
Muka, Richard S.; and Russo, Carl J., to Varian Associates, Inc. Process for treating a semiconductor material by blackbody radiation source with constant planar energy flux. 4,421,479., Cl. 432-31.000.
Mulder, Albertus J. Derivatives of 1,5-dimethylbicyclo [3,2,1] octane, the preparation of these compounds and their use as perfume compound. 4,421,689., Cl. 549-360.000.
Muller, Alfred; and Sauer, Joseph, to Robert Bosch GmbH. Hydraulic regulating device for load operated gear shift systems. 4,420,994., Cl. 74-867.000.
Muller, Jakob, to Textilma AG. Method for the production of a fabric, particularly tape fabric, loom for the performance of the method and fabric produced according to the method. 4,421,142., Cl. 139-117.000.
Muller, Werner C.; and Miller, Franklyn D., to National Distillers and Chemical Corporation. Fermentable sugar from the hydrolysis of carbohydrate polymer. 4,421,856., Cl. 435-161.000.
Muller, Wolfgang H. E.; and Hofmann, Peter, to Chemische Werke Huls AG. Preparation of fatty acid esters. 4,421,691., Cl. 260-410.90R.
Muller, Wolfgang H. E.: *See*—
Hofmann, Peter; and Muller, Wolfgang H. E., 4,421,692., Cl. 260-410.90R.
Mullins, John M., to Hughes Tool Company. Rock bit with improved shirttail ventilation. 4,421,184., Cl. 175-337.000.
Mumola, Peter B.; Yoder, Paul R., Jr.; Casas, Raul E.; and Grossman, William M., to Perkin-Elmer Corporation, The. Axisymmetric spatial/temporal encoder. 4,422,046., Cl. 330-4.300.
Munck, Lars; Gibbons, Gregory C.; and Feil, Carol, to De Forenede Bryggerier A/S. Method for identifying botanical component parts of ground seeds. 4,421,772., Cl. 426-231.000.
Munden, Jeffery E.: *See*—
Masters, Adrian G.; and Munden, Jeffery E., 4,421,015., Cl. 99-332.000.
Murakami, Katsuhiko: *See*—
Koto, Toshio; Murakami, Katsuhiko; and Fujitani, Yugo, 4,421,185., Cl. 177-25.000.
Murakami, Tadashi; Suzuka, Teruo; Inoue, Yukio; and Aizawa, Shirou, to Research Association for Residual Oil Processing. Process for simultaneously cracking heavy hydrocarbons into light oils and producing hydrogen. 4,421,635., Cl. 208-112.000.
Murata, Hiroshi: *See*—
Edahiro, Tadao; Yoshida, Kazuaki; Ogura, Kunio; Shibuya, Seiji; and Murata, Hiroshi, 4,421,539., Cl. 65-3.120.
Murata, Kyohei; Morise, Heiji; Yazaki, Yoichi; Maruyama, Kazushi; Nagayoshi, Haruyuki; and Kajiki, Etuji, to Nippon Steel Corporation. Method of cooling steel pipes. 4,421,575., Cl. 148-153.000.
Murata Manufacturing Co., Ltd.: *See*—
Kobayashi, Takashi; Shikama, Takashi; Yamamoto, Tomoyuki; and Yokota, Atsuo, 4,422,120., Cl. 361-24.000.

Muroi, Masayuki; and Kida, Makoto, to Takeda Chemical Industries, Ltd. Macbecin derivatives. 4,421,688., Cl. 260-239.30B.

Muroi, Masayuki: *See*—
Hasegawa, Toru; Muroi, Masayuki; and Tanida, Seiichi, 4,421,687., Cl. 260-239.30B.

Murphy, Ina H. Hole punching device. 4,421,000., Cl. 83-372.000.

Murphy, Michael R. Hunting arrow with locating means. 4,421,319., Cl. 273-416.000.

Murray, E. Donald: *See*—
Hoehn, Ernst; McKay, Curtis J.; and Murray, E. Donald, 4,421,852., Cl. 435-99.000.

Muryoi, Takeshi, to Nippon Kogaku K.K. Macro zoom lens barrel. 4,421,389., Cl. 350-429.000.

Musgrove, Peter J.: *See*—
Allan, John; and Musgrove, Peter J., 4,421,458., Cl. 416-117.000.

Musha, Tohru: *See*—
Ito, Kenichi; Musha, Tohru; and Kato, Kiichi, 4,422,168., Cl. 369-45.000.

Muskogee Environmental Conservation Co.: *See*—
Ricketts, William H., 4,420,916., Cl. 52-122.100.

Myking, Reidar. Panel mounted connector. 4,421,369., Cl. 339-36.000.

Nadarzynski, Edward A.: *See*—
Johnson, Lance H.; Kiselak, John A., II; Nadarzynski, Edward A.; and Pedersen, Raymond J., 4,422,144., Cl. 364-200.000.

Nadelson, Jeffrey: *See*—
Brand, Leonard J.; and Nadelson, Jeffrey, 4,421,752., Cl. 424-245.400.

Naegele, Dieter: *See*—
Lehner, August; Werther, Heinz U.; Naegele, Dieter; Lenz, Werner; Jun, Mong-Jon; Reimann, Horst; and Eckell, Albrecht, 4,421,840., Cl. 430-273.000.

Nagae, Michio: *See*—
Tsuda, Katsuhiro; Tanaka, Hisao; Nagae, Michio; and Imanaga, Yasuhiko, 4,421,885., Cl. 524-295.000.

Nagahara, Yasumori, to Ricoh Company, Ltd. Multiple mode copying apparatus. 4,421,405., Cl. 355-58.000.

Nagai, Seiji: *See*—
Taguchi, Kiyomi; Terada, Osamu; Morishita, Noriaki; Mihashi, Hiroshi; and Nagai, Seiji, 4,421,697., Cl. 264-30.000.

Nagai, Shigeki; Yorie, Takashi; Sugiura, Hisao; Hibi, Toru; Sato, Katsumi; Wada, Takuo; and Miyahara, Masahiko, to Hokko Chemical Industry Co. Ltd.; and Ube Industries, Ltd. Thiophene derivatives. 4,421,761., Cl. 424-275.000.

Nagai, Tadashi: *See*—
Nakamura, Ken; Nagai, Tadashi; and Takami, Masanori, 4,421,081., Cl. 123-310.000.

Nagasawa, Ikuo; and Ishii, Takashi, to Fuji Electric Co., Ltd. Surge absorber. 4,422,122., Cl. 361-127.000.

Nagasawa, Kinzo; and Ogamo, Akira, to Seikagaku Kogyo Co., Ltd. Process for separation of carbohydrates. 4,421,650., Cl. 210-635.000.

Nagase, Masaomi; and Miyagi, Hideo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Method of and apparatus for controlling the ignition timing of an internal combustion engine. 4,421,085., Cl. 123-416.000.

Nagashima, Masayoshi: *See*—
Takiguchi, Ryohei; and Nagashima, Masayoshi, 4,421,839., Cl. 430-164.000.

Nagata, Koji; Nishikawa, Mamoru; and Sato, Shiro, to Sumitomo Light Metal Industries, Ltd. Method for coating the inner surface of long tubes of small diameter. 4,421,790., Cl. 427-236.000.

Nagata, Masayoshi: *See*—
Takeda, Keiji; Nirasawa, Mitsuharu; and Nagata, Masayoshi, 4,421,838., Cl. 430-58.000.

Nagawa, Yugi: *See*—
Inanaga, Kazutoyo; and Nagawa, Yugi, 4,421,745., Cl. 424-177.000.

Nagayoshi, Haruyuki: *See*—
Murata, Kyohei; Morise, Heiji; Yazaki, Yoichi; Maruyama, Kazushi; Nagayoshi, Haruyuki; and Kajiki, Etuji, 4,421,575., Cl. 148-153.000.

Nagel, Walter A.; and Walsh, David J., to Marathon Oil Company. System and method for determining the relative permeability of an earth formation surrounding a wellbore. 4,420,975., Cl. 73-155.000.

Nagy, Gerald A. Bicycle exercise stand. 4,421,308., Cl. 272-73.000.

Naito, Hiroshi: *See*—
Miura, Masayoshi; Oda, Gen; Akami, Kenji; and Naito, Hiroshi, 4,422,086., Cl. 346-140.00R.

Naito, Kazuhisa: *See*—
Kaneko, Hideaki; and Naito, Kazuhisa, 4,421,789., Cl. 427-204.000.

Nakagawa, Fumio: *See*—
Shirai, Kenji; and Nakagawa, Fumio, 4,421,362., Cl. 303-115.000.

Nakagawa, Satoshi: *See*—
Uemura, Morito; Kishi, Kenichi; Nakagawa, Satoshi; Kida, Shuji; and Sugita, Hiroshi, 4,421,845., Cl. 430-544.000.

Nakahama, Ryoji, to Yamaha Motor Co., Ltd.; and Sanshin Industries Co., Ltd. Exhaust silencer structure for outboard engines. 4,421,490., Cl. 440-89.000.

Nakahara, Masaki: *See*—
Kawamoto, Isao; and Nakahara, Masaki, 4,421,758., Cl. 424-273.00R.

Nakahara, Masao: *See*—
Sakata, Hideo; Mizuno, Ichiro; Nakahara, Masao; and Sanpei, Takasi, 4,420,887., Cl. 33-147.00F.

Nakahara, Motohiro; Miyajiri, Tetsuo; Yoshioka, Naoki; and Kuwahara, Toru, to Nippon Telegraph & Telephone Public Corporation; and Sumitomo Electric Industries, Ltd. System for producing an optical fiber preform with gas volume control. 4,421,540., Cl. 65-3.120.

Nakai, Mamoru: *See*—
Umemura, Sumio; Fujii, Kozo; Nishihira, Keigo; Sawada, Hiroyuki; Tanaka, Shuji; Nakai, Mamoru; Yoshida, Hiroshi; and Kuroki, Yoshiaki, 4,421,925., Cl. 549-372.000.

Nakajima, Yoshikage: *See*—
Hamano, Sachiyuki; Kitamura, Shinichi; Igarashi, Toshiji; and Nakajima, Yoshikage, 4,421,763., Cl. 424-285.000.

Nakama, Akihiro: *See*—
Tokitsu, Tetsuya; Harada, Saburo; Yamasaki, Jiro; and Nakama, Akihiro, 4,421,480., Cl. 432-238.000.

Nakamura, Ken; Nagai, Tadashi; and Takami, Masanori, to Nissan Motor Co., Ltd. Spark-ignition internal combustion engine. 4,421,081., Cl. 123-310.000.

Nakamura, Kensaku. Resin pellet producing machine. 4,421,470., Cl. 425-311.000.

Nakanishi, Tomohiko: *See*—
Inoguchi, Kazuhiro; Nakanishi, Tomohiko; and Asano, Mitsuru, 4,421,699., Cl. 264-56.000.

Nakano, Yoshitomo: *See*—
Mita, Satoshi; Tanaka, Kouichi; Nakano, Yoshitomo; Saita, Harumi; and Nakayama, Akira, 4,421,954., Cl. 179-6.130.

Nakashima, Toshihide; Tanihara, Maso; and Takakura, Koichi, to Kuraray Co., Ltd. Column for adsorption of blood proteins. 4,421,684., Cl. 260-112.00B.

Nakasuji, Norikazu: *See*—
Kito, Tutomu; Nakasuji, Norikazu; Kataoka, Takashi; Inagaki, Hiroshi; and Shibahashi, Yutaka, 4,421,560., Cl. 106-21.000.

Nakayama, Akira: *See*—
Mita, Satoshi; Tanaka, Kouichi; Nakano, Yoshitomo; Saita, Harumi; and Nakayama, Akira, 4,421,954., Cl. 179-6.130.

Nakayama, Shozo; Kato, Kimio; Sugiura, Tusneo; Kato, Yoshio; Shugiura, Mikio; and Otu, Keiichiro, to K. K. Toyoda Jidoshokki Seisakusho; and Taihou Kogyo Kabushiki Kaisha. Sliding shoe for a rotatable swash-plate type refrigerant gas compressor. 4,420,986., Cl. 74-60.000.

Nalco Chemical Company: *See*—
Kekish, George T.; and Batton, Carol B., 4,421,791., Cl. 427-239.000.

Namdari, Bahram; and Namdari, Kathleen D. Motorized apparatus for dispensing cake icing. 4,421,251., Cl. 222-99.000.

Namdari, Kathleen D.: *See*—
Namdari, Bahram; and Namdari, Kathleen D., 4,421,251., Cl. 222-99.000.

Napolitano, Pellegrino E., to Hudson Engineering Company. Seal with dual metallic rings having contacting lips. 4,421,325., Cl. 277-27.000.

Narducy, Kenneth W.: *See*—
Arbir, Francis W.; Raden, Daniel S.; Narducy, Kenneth W.; and Casati, Francois M., 4,421,673., Cl. 502-167.000.
Arbir, Francis W.; Raden, Daniel S.; and Narducy, Kenneth W., 4,421,869., Cl. 521-126.000.

Narita, Ryuho: *See*—
Oota, Hiroyuki; Aoshima, Terutaka; Yamamori, Kenji; and Narita, Ryuho, 4,421,974., Cl. 219-441.000.

Naruchi, Tatsuyuki: *See*—
Okamura, Noriaki; Toru, Takeshi; Oba, Takeo; Tanaka, Toshio; Bannai, Kiyoshi; Watanabe, Kenzo; Kurozumi, Seizi; Naruchi, Tatsuyuki; and Komoriya, Keiji, 4,421,914., Cl. 544-278.000.

Naruse, Toshihiro; Uehara, Kazuo; and Saito, Hideaki, to Kabushiki Kaisha Komatsu Seisakusho. Hydraulic circuit for a variable displacement pump. 4,420,937., Cl. 60-450.000.

Nashan, Gerd: *See*—
Weskamp, Wilhelm; Nashan, Gerd; and Stewen, Wilhelm, 4,421,604., Cl. 201-1.000.

National Distillers and Chemical Corporation: *See*—
Muller, Werner C.; and Miller, Franklyn D., 4,421,856., Cl. 435-161.000.

National Gypsum Company: *See*—
Winkowski, Daniel A., 4,421,808., Cl. 428-55.000.

National Starch And Chemical Corporation: *See*—
Hasuly, Michael J.; Solarek, Daniel B.; and Jarowenko, Wadym, 4,421,566., Cl. 106-213.000.

Nauchno Proizvodstven Kombinat Po Robotika "Beroe": *See*—
Radomirov, Radomir V.; Kolev, Kolyo R.; Enchev, Encho M.; and Ivanov, Ivan N., 4,422,065 , Cl. 340-347.00P.

Nayler, Douglas W. J.: *See*—
Beakley, Bruce E.; and Nayler, Douglas W. J., 4,421,173., Cl. 166-336.000.

Naylor, Nelson A. Micrometer adjustable backgauge. 4,420,890., Cl. 33-180.00R.

Nazarov, Alexandr M.: *See*—
Abishev, Dzhantore N.; Malyshev, Vitaly P.; Bauer, Ivan K.; Yarygin, Vladimir A.; Maisakov, Mikhail E.; Gainutdinov, Garifulla K.; Nazarov, Alexandr M.; Kusainov, Temirkhan A.; Burovoi, Isaak A.; and Omarov, Bulat N., 4,422,174., Cl. 373-115.000.

NCR Corporation: *See*—
Gupta, Desh B.; and Granzow, Robert H., 4,421,824., Cl. 428-211.000.

Neidhardt, Rudolf: *See*—
Gubbe, Bernd; Krause, Klaus-Dieter; Schonemann, Otto; and Neidhardt, Rudolf, 4,421,035., Cl. 108-6.000.

Nelles, Josef: *See*—
Ruch, Jean; and Nelles, Josef, 4,421,322., Cl. 277-12.000.

Nelsen, Murray D.; Kunze, Robert K., Jr.; Olsen, Robert F.; and Rushwald, Ira B., to Boeing Company, The. High efficiency broadband acoustic resonator and absorption panel. 4,421,201., Cl. 181-214.000.

Nelson, John G.: *See*—
Cohen, Malcolm M.; Palumbo, James J.; Johanson, David C.; and Nelson, John G., 4,421,393., Cl. 351-224.000.
Nerheim, Eldon, to Honeywell Inc. Proximity monitor. 4,422,075., Cl. 343-6.00R.
Nestor, John M. Automatic fishing jigger. 4,420,900., Cl. 43-17.000.
Netstal-Maschinen AG: *See*—
Egger, Caspar; Krebser, Rudolf; and Leuzinger, Hans, 4,421,469., Cl. 425-183.000.
Netupsky, Boris, to Dyform Engineering Ltd. Large-panel concrete wall bearing components. 4,420,915., Cl. 52-98.000.
Neumann, Don B.; Norton, Lyle K.; and Olson, Eric V., to American Hoechst Corporation. System and method for producing artwork for printed circuit boards. 4,422,083., Cl. 346-108.000.
Newman, Charles J.; and Hodges, Joseph T., to Grote Manufactering Company, Inc., The. Shock mounting device for a lamp. 4,422,136., Cl. 362-390.000.
Newnham, Robert E.: *See*—
Safari, Ahmad; Newnham, Robert E.; Cross, Leslie E.; and Schulze, Walter A., 4,422,003., Cl. 310-358.000.
Newton, John. Apparatus for cleaning trays. 4,420,854., Cl. 15-302.000.
Newton, Ronald O., to General Signal Corporation. Relay valve assembly. 4,421,360., Cl. 303-22.00A.
Neynaber Chemie GmbH: *See*—
Worschech, Kurt; and Wedl, Peter, 4,421,886., Cl. 524-310.000.
NGK Insulators Ltd.: *See*—
Oda, Isao; and Matsuhisa, Tadaaki, 4,421,702., Cl. 264-62.000.
Nichiban Co. Ltd.: *See*—
Ito, Toshio; Ninomiya, Hiroshi; and Yamagami, Kunio, 4,421,737., Cl. 424-28.000.
Nickles, R. Benton, to Halliburton Company. Dog locking sleeve. 4,421,138., Cl. 138-89.000.
Nickles, R. Benton, to Halliburton Company. Plug for offshore platforms and the like. 4,421,139., Cl. 138-89.000.
Nicoli, David F.: *See*—
Elings, Virgil B.; and Nicoli, David F., 4,421,860., Cl. 436-518.000.
Nicoloso, Dante: *See*—
Thuries, Edmond; Sigward, Pierre-Paul; Besson, Marcel; Van, Doan P.; and Nicoloso, Dante, 4,421,962., Cl. 200-144.0AP.
Nievergelt, Hermann: *See*—
Binnig, Gerd; Nievergelt, Hermann; Rohrer, Heinrich; and Weibel, Edmund, 4,422,002., Cl. 310-328.000.
Nijhuis, Gerrit J., to Machinefabriek G.J. Nijhuis B.V. Set of electrodes for an apparatus for electrically stunning slaughter cattle. 4,420,855., Cl. 17-1.00E.
Nikolai, William L. Method of pollution control involving the absorption of sulfur dioxide from stack gases. 4,421,726., Cl. 423-242.000.
Nilssen, Ole K. Electric insect trap power supply. 4,422,015., Cl. 315-209.00R.
Ninomiya, Hiroshi: *See*—
Ito, Toshio; Ninomiya, Hiroshi; and Yamagami, Kunio, 4,421,737., Cl. 424-28.000.
Nippon Air Brake Co., Ltd.: *See*—
Arikawa, Tetsuro; and Yamada, Hideyuki, 4,421,361., Cl. 303-92.000.
Nippon Electric Co., Ltd.: *See*—
Mori, Toshihiro, 4,422,178., Cl. 455-343.000.
Watanabe, Hiroshi, 4,422,160., Cl. 365-189.000.
Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Suzuki, Kenji, 4,422,050., Cl. 330-263.000.
Nippon Kayaku Kabushiki Kaisha: *See*—
Ito, Toshio; Ninomiya, Hiroshi; and Yamagami, Kunio, 4,421,737., Cl. 424-28.000.
Nippon Kogaku K.K.: *See*—
Muryoi, Takeshi, 4,421,389., Cl. 350-429.000.
Nippon Kokan Kabushiki Kaisha: *See*—
Taguchi, Kiyomi; Terada, Osamu; Morishita, Noriaki; Mihashi, Hiroshi; and Nagai, Seiji, 4,421,697., Cl. 264-30.000.
Nippon Mektron Co., Ltd.: *See*—
Kameda, Eiichi, 4,421,958., Cl. 200-5.00A.
Nippon Sanso K.K.: *See*—
Mori, Tatsuo; and Ishii, Juichi, 4,421,536., Cl. 62-18.000.
Nippon Soken, Inc.: *See*—
Inoguchi, Kazuhiro; Nakanishi, Tomohiko; and Asano, Mitsuru, 4,421,699., Cl. 264-56.000.
Kawai, Hisasi; Sada, Hiroshi; Igashira, Toshihiko; and Yoshinaga, Toru, 4,421,091., Cl. 123-620.000.
Nippon Steel Corporation: *See*—
Murata, Kyohei; Morise, Heiji; Yazaki, Yoichi; Maruyama, Kazushi; Nagayoshi, Haruyuki; and Kajiki, Etuji, 4,421,575., Cl. 148-153.000.
Tokitsu, Tetsuya; Harada, Saburo; Yamasaki, Jiro; and Nakama, Akihiro, 4,421,480., Cl. 432-238.000.
Yamamoto, Takaaki; and Ohya, Yoshihiro, 4,422,061., Cl. 336-218.000.
Nippon Telegraph & Telephone Public Corporation: *See*—
Edahiro, Tadao; Yoshida, Kazuaki; Ogura, Kunio; Shibuya, Seiji; and Murata, Hiroshi, 4,421,539., Cl. 65-3.120.
Nakahara, Motohiro; Miyajiri, Tetsuo; Yoshioka, Naoki; and Kuwahara, Toru, 4,421,540., Cl. 65-3.120.
Nippon Zeon Co. Ltd.: *See*—
Ogura, Shunichiro, 4,421,607., Cl. 203-60.000.
Oyama, Motofumi; and Hashimoto, Kinro, 4,421,884., Cl. 524-209.000.
Nira International B.V.: *See*—
de Graaf, Nicolaas R., 4,422,071., Cl. 340-825.440.
Nirasawa, Mitsuharu: *See*—
Takeda, Keiji; Nirasawa, Mitsuharu; and Nagata, Masayoshi, 4,421,838., Cl. 430-58.000.
Nishi, Masataka: *See*—
Furuto, Yoshio; Meguro, Shinichiro; Suzuki, Takuya; Ito, Ikuo; Ando, Toshinari; Nishi, Masataka; and Shimamoto, Susumu, 4,421,946., Cl. 174-128.00S.
Nishida, Hideo: *See*—
Yoshinaga, Yoichi; Kobayashi, Hiromi; Ueda, Shinjiro; Takada, Yoshihiro; and Nishida, Hideo, 4,421,457., Cl. 415-211.000.
Nishida, Mitsuhiro: *See*—
Yamamoto, Sakuei; Inao, Hiroshi; Tokumitsu, Kiyonori; Nishida, Mitsuhiro; and Kumamoto, Sadahiro, 4,421,324., Cl. 277-24.000.
Nishihira, Keigo: *See*—
Umemura, Sumio; Fujii, Kozo; Nishihira, Keigo; Sawada, Hiroyuki; Tanaka, Shuji; Nakai, Mamoru; Yoshida, Hiroshi; and Kuroki, Yoshiaki, 4,421,925., Cl. 549-372.000.
Nishikawa, Mamoru: *See*—
Nagata, Koji; Nishikawa, Mamoru; and Sato, Shiro, 4,421,790., Cl. 427-236.000.
Nishino, Hiroshi; and Suzuki, Masayuki, to Takeda Chemical Industries, Ltd. Method of removing ozone and composition therefor. 4,421,533., Cl. 55-68.000.
Nissan Motor Company, Limited: *See*—
Arima, Sumitsugu; Tsuda, Hiroshi; and Fukunaga, Yukio, 4,421,960., Cl. 200-61.540.
Enoshima, Toshio; Furuhashi, Shoji; and Tamura, Hideyuki, 4,420,967., Cl. 73-35.000.
Ikezawa, Kenji; Takao, Hiroshi; Aoki, Hiroyuki; and Kimura, Shinji, 4,421,787., Cl. 427-126.200.
Katayose, Shinji; and Ohwada, Masatsugu, 4,421,082., Cl. 123-333.000.
Mitsuoka, Toshihiro; and Seki, Shojiro, 4,421,802., Cl. 428-31.000.
Nakamura, Ken; Nagai, Tadashi; and Takami, Masanori, 4,421,081., Cl. 123-310.000.
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Nitto Chemical Industry Co., Ltd.: *See*—
Watanabe, Ichiro; Sakashita, Keiichi; and Ogawa, Yasuo, 4,421,855., Cl. 435-129.000.
Niziol, Chester. Self-assembly furniture. 4,421,366., Cl. 312-257.00A.
NL Industries, Inc.: *See*—
Beakley, Bruce E.; and Nayler, Douglas W. J., 4,421,173., Cl. 166-336.000.
Noble, Allen T., to Noble Linear Irrigation, Inc. Land irrigation system and method. 4,421,274., Cl. 239-183.000.
Noble Linear Irrigation, Inc.: *See*—
Noble, Allen T., 4,421,274., Cl. 239-183.000.
Noda, Akihiro: *See*—
Miyake, Itsuo; Okamoto, Keizo; Bundo, Motonori; and Noda, Akihiro, 4,421,891., Cl. 524-495.000.
Noda, Atsushi; and Hanakata, Takayoshi, to Canon Kabushiki Kaisha. Thermal printer. 4,421,428., Cl. 400-120.000.
Noda, Hideo, to Shimano Industrial Company Limited. Fishing reel. 4,421,285., Cl. 242-221.000.
Noda, Taizo, to Kohshoh Limited. Device for adjusting the length of a band or the like. 4,420,858., Cl. 24-170.000.
Nogaj, Alfred: *See*—
Reichardt, Manfred; Pieper, Christian; Nogaj, Alfred; Sandhu, Surinder S.; and Gartner, Eckhard, 4,421,708., Cl. 264-206.000.
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Nojiri, Akio; Sawasaki, Takashi; Noguchi, Isamu; Onobori, Shinji; and Sasazima, Junnosuke, to Furukawa Electric Co., Ltd., The. Composition for a crosslinked polyolefin foam. 4,421,867., Cl. 521-82.000.
Nolle, Dieter: *See*—
Mahn, Gustav; Nolle, Dieter; and Eulenburg, Ulrich, 4,421,554., Cl. 75-52.000.
Nomura, Noboru; Kanai, Kenji; Kaminaka, Nobuyuki; and Nouchi, Norimoto, to Matsushita Electric Industrial Co., Ltd. Thin film magnetic head and method of making it. 4,422,117., Cl. 360-126.000.
Nomura, Yosio: *See*—
Matsuno, Tatsuji; and Nomura, Yosio, 4,422,034., Cl. 324-51.000.
Nordson Corporation: *See*—
Kuipers, Peter, 4,421,499., Cl. 493-23.000.
Norman, John H., to GA Technologies Inc. Sulfuric acid-sulfur heat storage cycle. 4,421,734., Cl. 423-648.00R.
Noro, Shuhei: *See*—
Futamura, Yoshisumi; Komeiji, Shigeki; Noro, Shuhei; Hasegawa, Junzo; Matsunari, Fumio; and Ikeda, Toshiaki, 4,421,494., Cl. 464-111.000.
Norsk Hydro a.s.: *See*—
Giskehaug, Karl J.; Loites, Kjell O.; and Mejdell, Glor T., 4,421,649., Cl. 210-634.000.
Mueller, Udo, 4,421,551., Cl. 75-0.50B.
North star Ice Equipment Corporation: *See*—
Bartholmey, Don S.; Babcock, Ronald D.; and Weisel, George L., 4,420,949., Cl. 62-354.000.
Northern Engineering Industries plc: *See*—
Stuart, Ronald B.; and Troup, Alan G., 4,421,063., Cl. 122-4.00D.
Northern Telecom Limited: *See*—
Burnett, Thomas R., 4,421,233., Cl. 206-503.000.
Pan, Ali, 4,421,284., Cl. 242-158.00R.
Shepherd, Frank R.; and Westwood, William D., 4,422,090., Cl. 357-23.000.

Zielinski, Lech S., 4,421,953., Cl. 179-2.0EC.
Norton, Lyle K.: *See*—
Neumann, Don B.; Norton, Lyle K.; and Olson, Eric V., 4,422,083., Cl. 346-108.000.
Nouchi, Norimoto: *See*—
Nomura, Noboru; Kanai, Kenji; Kaminaka, Nobuyuki; and Nouchi, Norimoto, 4,422,117., Cl. 360-126.000.
Novinski, Edward R., to Metco, Inc. Aluminum clad refractory oxide flame spraying powder. 4,421,799., Cl. 427-423.000.
Nowack, Gerhard P.; Johnson, Marvin M.; and Kukes, Simon G., to Phillips Petroleum Company. Demetallization of heavy oils. 4,421,638., Cl. 208-251.00R.
Nowlan, Michael J.: *See*—
Armini, Anthony J.; and Nowlan, Michael J., 4,421,589., Cl. 156-382.000.
Noyes, Walter O.: *See*—
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Nuclear Systems, Inc.: *See*—
Hibbard, Ray W.; and Hines, Randal C., 4,421,992., Cl. 307-41.000.
Numata, Mitsuo; Mimamida, Isao; Yamaoka, Masayoshi; Shiraishi, Mitsuru; and Miyawaki, Toshio, to Takeda Chemical Industries, Ltd. Cephalosporin derivatives. 4,421,912., Cl. 544-27.000.
Nuodex Inc.: *See*—
DiBella, Eugene P., 4,421,565., Cl. 106-180.000.
Nusbaumer, Kay T.; and Whitaker, Terrell R., to PHD, Inc. Plug assembly for sealing a pressure fluid passage in a manifold or the like. 4,421,137., Cl. 138-89.000.
Nutrisearch Company: *See*—
Chung, Frank H. Y., 4,421,777., Cl. 426-553.000.
N.V. Raychem S.A.: *See*—
Moisson, Marc F., 4,421,945., Cl. 174-92.000.
Oakes, Thomas R.: *See*—
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Oba, Takeo: *See*—
Okamura, Noriaki; Toru, Takeshi; Oba, Takeo; Tanaka, Toshio; Bannai, Kiyoshi; Watanabe, Kenzo; Kurozumi, Seizi; Naruchi, Tatsuyuki; and Komoriya, Keiji, 4,421,914., Cl. 544-278.000.
Occidental Chemical Corporation: *See*—
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Stachurski, John Z. O.; Pouli, Dirk; Ripa, John A.; and Pokrzyk, Gerald F., 4,421,626., Cl. 204-290.00R.
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O'Connor, James M.; Lickei, Donald L.; and Sessions, Willie J., to Olin Corporation. Polyurethane oligomer impact and shrinkage modifiers for thermoset polyesters. 4,421,894., Cl. 525-28.000.
Oda, Gen: *See*—
Miura, Masayoshi; Oda, Gen; Akami, Kenji; and Naito, Hiroshi, 4,422,086., Cl. 346-140.00R.
Oda, Hiroyuki: *See*—
Mori, Fumio; Itsubo, Junichi; Oda, Hiroyuki; and Matsuda, Gunji, 4,421,804., Cl. 428-35.000.
Oda, Isao; and Matsuhisa, Tadaaki, to NGK Insulators Ltd. Ceramic recuperative heat exchangers and a method for producing the same. 4,421,702., Cl. 264-62.000.
Ogamo, Akira: *See*—
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Ogawa, Yasuo: *See*—
Watanabe, Ichiro; Sakashita, Keiichi; and Ogawa, Yasuo, 4,421,855., Cl. 435-129.000.
Ogura, Kunio: *See*—
Edahiro, Tadao; Yoshida, Kazuaki; Ogura, Kunio; Shibuya, Seiji; and Murata, Hiroshi, 4,421,539., Cl. 65-3.120.
Ogura, Shunichiro, to Nippon Zeon Co. Ltd. Process for extractive distillation of plural hydrocarbon mixtures. 4,421,607., Cl. 203-60.000.
Oguri, Yukihiro: *See*—
Shinohara, Tatsuo; Oguri, Yukihiro; Fujimori, Yukio; and Kondo, Hiroyuki, 4,421,756., Cl. 424-258.000.
Oguro, Keisuke: *See*—
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O'Hagan, Michael A.: *See*—
Goldbach, Gary O.; and O'Hagan, Michael A., 4,421,038., Cl. 110-245.000.
Oharek, Frank J.: *See*—
Baldwin, Dorothy M.; Oharek, Frank J.; and Spooner, Archer M., 4,421,486., Cl. 434-44.000.
Ohe, Takeshi, to Jidosha Kiki Co., Ltd. Variable displacement pump of vane type. 4,421,462., Cl. 417-310.000.
Ohlson, John L.; and Isgur, Irving E., to W. R. Grace & Co. Polyurethane polymer amine salt as a dyeing aid, particularly for polyolefin fibers. 4,421,826., Cl. 428-394.000.
Ohlsson, Willy: *See*—
Robinson, Thomas; and Ohlsson, Willy, 4,420,978., Cl. 73-643.000.
Ohmukai, Yoshimi: *See*—
Adachi, Kinichi; Shimoda, Hisanori; Hirata, Yasushi; and Ohmukai, Yoshimi, 4,421,477., Cl. 431-325.000.
Ohnesorge, David H.: *See*—
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Ohtaka, Keiji: *See*—
Suzuki, Takashi; Iizuka, Kiyoshi; Ohtaka, Keiji; and Mizutani, Hidemasa, 4,421,398., Cl. 354-200.000.
Ohtani, Hiroo: *See*—
Kudo, Takeo; Okada, Yasutaka; Moroishi, Taishi; Ikeda, Akio; Ohtani, Hiroo; and Yoshikawa, Kunihiko, 4,421,571., Cl. 148-11.50R.
Ohwada, Masatsugu: *See*—
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Ohya, Yoshihiro: *See*—
Yamamoto, Takaaki; and Ohya, Yoshihiro, 4,422,061., Cl. 336-218.000.
Oji Paper Co., Ltd.: *See*—
Ikezawa, Hideo; Takahashi, Yoshiyuki; and Hashimoto, Hideaki, 4,421,344., Cl. 282-27.500.
Okada, Tsuneyoshi, to Celanese Corporation. Sustained high arc resistant polyester composition. 4,421,888., Cl. 524-371.000.
Okada, Yasutaka: *See*—
Kudo, Takeo; Okada, Yasutaka; Moroishi, Taishi; Ikeda, Akio; Ohtani, Hiroo; and Yoshikawa, Kunihiko, 4,421,571., Cl. 148-11.50R.
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Okamura, Masatoshi: *See*—
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Okamura, Noriaki; Toru, Takeshi; Oba, Takeo; Tanaka, Toshio; Bannai, Kiyoshi; Watanabe, Kenzo; Kurozumi, Seizi; Naruchi, Tatsuyuki; and Komoriya, Keiji, to Teijin Limited. Thiazolo[3,2-a]pyrimidines, derivatives thereof, processes for production thereof, and pharmaceutical use thereof. 4,421,914., Cl. 544-278.000.
Okazaki, Mari: *See*—
Kamiya, Hideo; Shinohara, Hiroshi; Otuka, Yasuhiro; and Okazaki, Mari, 4,421,720., Cl. 422-97.000.
Oku, Yukio: *See*—
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Okumura, Saburo: *See*—
Shinkawa, Tsutomu; Yoshino, Akihide; Konishi, Hitoshi; Komuro, Yoshiaki; Hamada, Satoshi; and Okumura, Saburo, 4,421,152., Cl. 164-258.000.
Okuyama, Michio: *See*—
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Olavesen, Christopher, to Exxon Research and Engineering Co. Catalytic dewaxing with a hydrogen form zeolite L catalyst. 4,421,634., Cl. 208-111.000.
Oldenkamp, Ralph J., to Vend-A-Copy, Inc. Power down circuit for data protection in a microprocessor-based system. 4,422,163., Cl. 365-229.000.
Olin Corporation: *See*—
Fiorucci, Louis C.; and Morgan, Michael J., 4,421,662., Cl. 252-70.000.
O'Connor, James M.; Lickei, Donald L.; and Sessions, Willie J., 4,421,894., Cl. 525-28.000.
Olschewski, Armin; Brandenstein, Manfred; and Walter, Lothar, to SKF Kugellagerfabriken GmbH. Rolling bearing for lengthwise movement having resilient guide element. 4,421,363., Cl. 308-6.00C.
Olsen, Robert F.: *See*—
Nelsen, Murray D.; Kunze, Robert K., Jr.; Olsen, Robert F.; and Rushwald, Ira B., 4,421,201., Cl. 181-214.000.
Olsen, Thomas O. Single ply roofing system. 4,421,581., Cl. 156-71.000.
Olson, David H.; and Rodewald, Paul G., to Mobil Oil Corporation. Catalyst and process for selective production of para-dialkysubstituted benzenes. 4,421,941., Cl. 585-467.000.
Olson, Eric V.: *See*—
Neumann, Don B.; Norton, Lyle K.; and Olson, Eric V., 4,422,083., Cl. 346-108.000.
Olsson, Burton K.: *See*—
Morley, James P.; and Olsson, Burton K., 4,421,327., Cl. 277-84.000.
Olympus Optical Co. Ltd.: *See*—
Ito, Kenichi; Musha, Tohru; and Kato, Kiichi, 4,422,168., Cl. 369-45.000.
Iwasawa, Teruo; and Tojiki, Hitomi, 4,422,023., Cl. 318-384.000.
Kenjyo, Hideyuki, 4,422,182., Cl. 455-614.000.
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Momii, Isao; Chubachi, Noriyoshi; and Kushibiki, Junichi, 4,420,979., Cl. 73-644.000.
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Omco, Inc.: *See*—
Hoyt, Richard E., 4,420,864., Cl. 29-263.000.
Omega Air Flow-21, Ltd.: *See*—
Pryputsch, Gunter G.; Leila, Lennox M.; Parkinson, Gerald E.; and Arneson, Leonard A., 4,421,018., Cl. 99-447.000.
O'Neill, Robert M., to Peavey Electronics Corp. Loud speaker with minimized magnetic leakage. 4,421,956., Cl. 179-120.000.
Onobori, Shinji: *See*—
Nojiri, Akio; Sawasaki, Takashi; Noguchi, Isamu; Onobori, Shinji; and Sasazima, Junnosuke, 4,421,867., Cl. 521-82.000.

Oota, Hiroyuki; Aoshima, Terutaka; Yamamori, Kenji; and Narita, Ryuho, to Tokyo Shibaura Denki Kabushiki Kaisha. Electric rice cooker. 4,421,974., Cl. 219-441.000.
Opto-Systems Ltd.: *See*—
Magner, Bengt, 4,421,434., Cl. 403-175.000.
Orain, Michel A., to Glaenzer Spicer. Homokinetic transmission joint in particular for the driving wheel of a front wheel drive vehicle. 4,421,196., Cl. 180-257.000.
Orem, Howard L., to Cogswell, Richard B. Framing and layout square. 4,420,891., Cl. 33-476.000.
Organi, Henri, to Alsthom-Atlantique. Apparatus for checking for leaks from metal-clad high-tension electric gear. 4,420,970., Cl. 73-46.000.
Oriental Metal Mfg. Co.: *See*—
Tsumura, Kenji; and Yamashita, Masayuki, 4,421,606., Cl. 203-10.000.
Orloff, Eugene F.; Horowitz, Martin; and Ritter, Charles H., to McDonnell Douglas Corporation; and Gull Airborne Instruments, Inc. Multiplexed true mass gaging system. 4,420,976., Cl. 73-304.00C.
Oros, Leo J.: *See*—
Graue, William D.; and Oros, Leo J., 4,421,696., Cl. 261-123.000.
Osamu, Yuri: *See*—
Hiroshi, Yasuba; Masahiro, Umeda; and Osamu, Yuri, 4,421,837., Cl. 430-31.000.
Osepchuk, John M., to Raytheon Company. Microwave oven having rotating conductive radiators. 4,421,968., Cl. 219-10.55F.
Oshima, Akinobu: *See*—
Shimizu, Shigeki; and Oshima, Akinobu, 4,421,841., Cl. 430-285.000.
Osumi, Yasuaki; Suzuki, Hiroshi; Kato, Akihiko; and Oguro, Keisuke, to Agency of Industrial Science & Technology; and Ministry of International Trade & Industry. Alloy for occlusion of hydrogen. 4,421,718., Cl. 420-443.000.
Otis Engineering Corporation: *See*—
Laky, Tibor; Lane, William C.; and Turner, Kebbie J., Sr., 4,421,286., Cl. 244-116.000.
Otis, Robert M.: *See*—
Thomas, Stephen W.; and Otis, Robert M., 4,422,165., Cl. 367-40.000.
Otsuka Chemical Co., Ltd.: *See*—
Goto, Takeshi; Soeda, Takashi; Asai, Nobuyoshi; and Tanaka, Akira, 4,421,693., Cl. 260-464.000.
Otsuka, Shoichi: *See*—
Inaba, Hajimu; Miyashita, Hideo; and Otsuka, Shoichi, 4,422,142., Cl. 364-200.000.
Ott, Karl-Heinz: *See*—
Lindner, Christian; and Ott, Karl-Heinz, 4,421,901., Cl. 525-309.000.
Otu, Keiichiro: *See*—
Nakayama, Shozo; Kato, Kimio; Sugiura, Tusneo; Kato, Yoshio; Shugiura, Mikio; and Otu, Keiichiro, 4,420,986., Cl. 74-60.000.
Otuka, Yasuhiro: *See*—
Kamiya, Hideo; Shinohara, Hiroshi; Otuka, Yasuhiro; and Okazaki, Mari, 4,421,720., Cl. 422-97.000.
Overhoff, Heinz-Juergen: *See*—
McKee, Graham E.; Brandstetter, Franz; Echte, Adolf; Hambrecht, Juergen; Overhoff, Heinz-Juergen; Priebe, Edmund; Schwaab, Josef; and Siebel, Peter, 4,421,875., Cl. 523-335.000.
Owatari, Akio, to Epson Corporation. Jet printing ink composition. 4,421,559., Cl. 106-20.000.
Owens-Corning Fiberglas Corporation: *See*—
Dunn, Charles S.; and Seng, Stephen, 4,422,172., Cl. 373-94.000.
McKinney, Charles D., III, 4,421,282., Cl. 242-18.00G.
Owens-Illinois, Inc.: *See*—
Zauner, Otto, 4,421,226., Cl. 198-534.000.
Owens, Peter J.: *See*—
Dolan, Michael J.; McGovern, Stephen J.; and Owens, Peter J., 4,421,636., Cl. 208-113.000.
Oy Finn-Aqua Ltd.: *See*—
Huhta-Koivisto, Eako, 4,421,605., Cl. 202-181.000.
Oyama, Motofumi; and Hashimoto, Kinro, to Nippon Zeon Co. Ltd.; Toyota Jidosha Kabushiki Kaisha; and Toyoda Gosei Co. Ltd. Oil-resistant rubber composition. 4,421,884., Cl. 524-209.000.
Oyama, Yoshishige: *See*—
Kuroiwa, Hiroshi; and Oyama, Yoshishige, 4,420,972., Cl. 73-118.000.
Padilla, Isaac F., Sr. Well gas powered well effluent heat treating system. 4,421,062., Cl. 122-1.00R.
Pako Corporation: *See*—
Kaufmann, Kenneth M., 4,422,152., Cl. 364-502.000.
Palfalvi, Gyorgy: *See*—
Bodas, Janos; Papp, Istvan; Palfalvi, Gyorgy; and Vadas, Zoltan, 4,420,950., Cl. 62-402.000.
Palfreyman, Michael G.; and McDonald, Ian A., to Merrell Toraude et Compagnie. Compounds and methods for treating depression. 4,421,767., Cl. 424-319.000.
Palmer, Jay W.; and Gaynor, John C., to United States Gypsum Company. Process for purifying phosphogypsum. 4,421,731., Cl. 423-555.000.
Palumbo, James J.: *See*—
Cohen, Malcolm M.; Palumbo, James J.; Johanson, David C.; and Nelson, John G., 4,421,393., Cl. 351-224.000.
Pan, Ali, to Northern Telecom Limited. Reeling of cable. 4,421,284., Cl. 242-158.00R.
Pan, Peter N. Y.; and Fulkerson, Gregory M., to Paxall, Inc. Double tray case. 4,421,229., Cl. 206-44.00R.
Papajohn, Elissa D. Pantyhose with sanitary napkin holder. 4,421,512., Cl. 604-396.000.
Papastavros, Demos. Cooling system. 4,420,941., Cl. 62-402.000.
Papp, Istvan: *See*—
Bodas, Janos; Papp, Istvan; Palfalvi, Gyorgy; and Vadas, Zoltan, 4,420,950., Cl. 62-402.000.
Papst Motoren GmbH & Co. KG: *See*—
Cap, Heinrich, 4,422,116., Cl. 360-109.000.
Pargee, Robert W., Jr., to Eeco Incorporated. Television burst service. 4,422,093., Cl. 358-12.000.
Parker-Hannifin Corporation: *See*—
Jelinek, Jerry G., 4,421,329., Cl. 277-178.000.
Parker, John A.: *See*—
Varma, Indra K.; Fohles, George M.; and Parker, John A., 4,421,820., Cl. 428-246.000.
Parkinson, Gerald E.: *See*—
Pryputach, Gunter G.; Leila, Lennox M.; Parkinson, Gerald E.; and Arneson, Leonard A., 4,421,018., Cl. 99-447.000.
Parkison, Richard G.; and Hofstetter, Edward G., to American Standard, Inc. Valve diaphragm. 4,421,294., Cl. 251-86.000.
Parkison, Richard G., to American Standard, Inc. Valve diaphragm. 4,421,295., Cl. 251-86.000.
Parlasti, Conrad A. Guyline tension device for communication towers. 4,420,917., Cl. 52-123.100.
Parlenvi, Paul; and Almlatt, Ingemar H. G. Aid for curing or mitigating stammering. 4,421,488., Cl. 434-185.000.
Parsons, Norman C.; and Finley, Joseph H., to FMC Corporation. Production of alkoxyalkyl phosphate esters. 4,421,695., Cl. 260-974.000.
Partridge, John J.; Shiuey, Shian-Jan; and Uskokovic, Milan R., to Hoffmann-La Roche Inc. Process for the preparation of 24,24-difluoro-1α,25-dihydroxy vitamin D_3 and intermediates obtained therefrom. 4,421,690., Cl. 260-397.100.
Patalon, Heinrich: *See*—
Holz, Peter; Patalon, Heinrich; and Hartkopf, Edgar, 4,421,481., Cl. 432-239.000.
Patarini, Leon: *See*—
Lombardo, Paul; Patarini, Leon; and Imlah, James, 4,421,247., Cl. 220-354.000.
Patel, Bhanu C., to United States of America, National Aeronautics and Space Administration. Method and technique for installing lightweight, fragile, high-temperature fiber insulation. 4,421,700., Cl. 264-59.000.
Pateman, Edwin: *See*—
Wilkinson, Wilfred H.; Pateman, Edwin; Gale, Anthony G.; and Slinger, John, 4,421,153., Cl. 164-35.000.
Patterson, William A.: *See*—
Thorne, William D.; and Patterson, William A., 4,421,025., Cl. 101-93.040.
Patton, Paul B.: *See*—
Clark, Rodney L.; Landis, William R.; Patton, Paul B.; and Yancey, Charles B., 4,422,067., Cl. 340-508.000.
Patton, Suzanne. Saddle rack. 4,421,238., Cl. 211-87.000.
Paul, Bernt, to Siemens Aktiengesellschaft. Control method and control apparatus for operating a reformed gas generator and an internal combustion engine connected thereto. 4,421,071., Cl. 123-1.00A.
Paul, Graham R. Cat ports. 4,421,058., Cl. 119-19.000.
Pauling, Horst, to Hoffmann-La Roche Inc. Aluminum pyridinethiols as antimicrobials. 4,421,749., Cl. 424-200.000.
Paxall, Inc.: *See*—
Pan, Peter N. Y.; and Fulkerson, Gregory M., 4,421,229., Cl. 206-44.00R.
Paxton, Michael M.: *See*—
Bates, John F.; Brager, Howard R.; and Paxton, Michael M., 4,421,572., Cl. 148-12.00E.
Payen, Pierre. Process for the manufacture of a fancy yarn. 4,420,927., Cl. 57-288.000.
PCR Research Chemicals, Inc.: *See*—
Bartsch, Richard A., 4,421,923., Cl. 549-349.000.
Peabody ABC Corporation: *See*—
Hoy, Robert W., 4,421,202., Cl. 181-252.000.
Peavey Electronics Corp.: *See*—
O'Neill, Robert M., 4,421,956., Cl. 179-120.000.
Pedersen, Raymond J.: *See*—
Johnson, Lance H.; Kiselak, John A., II; Nadarzynski, Edward A.; and Pedersen, Raymond J., 4,422,144., Cl. 364-200.000.
Pennwalt Corporation: *See*—
Kulischenko, Walter, 4,421,495., Cl. 464-51.000.
Vidal, Frederick D.; and Jayaraman, Anantharaman, 4,421,774., Cl. 426-319.000.
Percarpio, Edward P., to Becton Dickinson and Company. Multiple sample needle valve. 4,421,123., Cl. 128-766.000.
Perkin-Elmer Corporation, The: *See*—
Mumola, Peter B.; Yoder, Paul R., Jr.; Casas, Raul E.; and Grossman, William M., 4,422,046., Cl. 330-4.300.
Pernet, Michel: *See*—
Eischen, Gaston; Eulenberg, Thomas; Gowert, Helmut; Grablowitz, Rainer; and Pernet, Michel, 4,421,541., Cl. 65-99.300.
Perobelli, Aldo: *See*—
Pessina, Giorgio; and Perobelli, Aldo, 4,421,221., Cl. 198-372.000.
Pessina, Giorgio; and Perobelli, Aldo. Revolving table for book-binding stackers and the like. 4,421,221., Cl. 198-372.000.
Peters, Reinhard: *See*—
Buthe, Ingolf; Straehle, Wolfgang; Marx, Matthias; and Peters, Reinhard, 4,421,872., Cl. 521-174.000.

Peterson, Donald J., to Walker Forge, Inc. Method of cold coining a toothed segment for an endless track wheel and two-piece die therefor and article formed thereby. 4,420,962., Cl. 72-360.000.

Petri, Randy J.: *See—*
Claar, Terry D.; and Petri, Randy J., 4,421,661., Cl. 252-70.000.

Petrofsky, Jerrold S.; and Glaser, Roger M., to Wright State University. Vehicle for the paralyzed. 4,421,336., Cl. 280-252.000.

Petrov, Alexander S.; and Konstantinov, Mihail S., to V M E I "Lenin". Method of and apparatus for the pressworking of articles. 4,420,964., Cl. 72-451.000.

Petzold, Manfred: *See—*
Rutzen, Horst; and Petzold, Manfred, 4,421,932., Cl. 564-292.000.

Petzow, Gunter: *See—*
Claussen, Nils; Petzow, Gunter; and Brook, Richard J., 4,421,861., Cl. 501-103.000.

Pfizer Inc.: *See—*
Crawford, Thomas C., 4,421,924., Cl. 549-370.000.

PHD, Inc.: *See—*
Nusbaumer, Kay T.; and Whitaker, Terrell R., 4,421,137., Cl. 138-89.000.

Philip Morris Incorporated: *See—*
Gellatly, Grant, 4,421,126., Cl. 131-371.000.

Philipp Kreis GmbH & Co.: *See—*
Kreis, Philipp, 4,421,095., Cl. 126-91.00R.

Phillips, Cecil L., to Scott Bader Company Limited. Composites and methods for providing metal clad articles and articles produced. 4,421,827., Cl. 428-418.000.

Phillips, James C.: *See—*
Jones, James L.; Keyser, E. Glen; and Phillips, James C., 4,421,544., Cl. 71-7.000.

Phillips Petroleum Company: *See—*
Louthan, Rector P.; Macdonell, Gary D.; and Lindstrom, Merlin R., 4,421,667., Cl. 252-156.000.
Mathis, Ronald D., 4,421,910., Cl. 528-388.000.
Nowack, Gerhard P.; Johnson, Marvin M.; and Kukes, Simon G., 4,421,638., Cl. 208-251.00R.
Pollock, Lyle W., 4,421,701., Cl. 264-60.000.
Seefluth, Charles L., 4,421,874., Cl. 523-315.000.

Philpott, Michael I.: *See—*
Laughon, Thomas C.; and Philpott, Michael I., 4,421,487., Cl. 434-169.000.

Phipps, Jack R.: *See—*
Lewis, Donald J.; and Phipps, Jack R., 4,421,280., Cl. 239-585.000.

Piazza, John R., to Western Electric Co., Inc. Strippable resists. 4,421,814., Cl. 428-195.000.

Picart, Francois, to Societe de Recherches Industrielles (S.O.R.I.). New cinnamoyl-cinnamic acid derivative, and its use as pharmaceutical. 4,421,927., Cl. 424-248.550.

Pickles, Joseph, to Ferro Manufacturing Corporation. Window regulator. 4,420,906., Cl. 49-352.000.

Pieper, Christian: *See—*
Reichardt, Manfred; Pieper, Christian; Nogaj, Alfred; Sandhu, Surinder S.; and Gartner, Eckhard, 4,421,708., Cl. 264-206.000.

Pietschmann, Helmut; Schmidt, Manfred; and Hirth, Emil, to Sybron Corporation. Delivery system for dental instruments or the like. 4,421,483., Cl. 433-77.000.

Pilenvik, Goran: *See—*
Gedeon, Andras; Lundell, Ulf; and Pilenvik, Goran, 4,421,113., Cl. 128-204.230.

Pilot Ink Company Ltd.: *See—*
Kito, Tutomu; Nakasuji, Norikazu; Kataoka, Takashi; Inagaki, Hiroshi; and Shibahashi, Yutaka, 4,421,560., Cl. 106-21.000.

Pina, Felice; and Galli, Graziano. Method for making printable self-adhesive tapes and the self-adhesive tapes obtained thereby. 4,421,817., Cl. 428-207.000.

Pinnow, Kenneth E.: *See—*
Rossomme, Paul A.; Eckenrod, John J.; Kovach, Curtis W.; and Pinnow, Kenneth E., 4,421,557., Cl. 75-125.000.

Pioneer Electronic Corporation: *See—*
Sugihara, Masanori, 4,422,114., Cl. 360-96.400.

Pitney Bowes Inc.: *See—*
Couper, Robert A.; Frediani, John K.; and Lillie, Terrance L., 4,422,070., Cl. 340-723.000.
Dannatt, Hugh St. L., 4,421,400., Cl. 355-1.000.
Kittredge, Lloyd G., 4,421,023., Cl. 101-45.000.
Kittredge, Lloyd G., 4,421,977., Cl. 235-101.000.
Pryor, Roger W., 4,422,063., Cl. 338-2.000.
Soderberg, John H.; Eckert, Alton B.; and McFiggans, Robert B., 4,422,148., Cl. 364-464.000.

Pitts Crick, Jonathan C.: *See—*
Pitts Crick, Ronald; and Pitts Crick, Jonathan C., 4,421,392., Cl. 351-224.000.

Pitts Crick, Ronald; and Pitts Crick, Jonathan C. Apparatus for detecting visual field defects of the eye. 4,421,392., Cl. 351-224.000.

Pivovarov, Alexandr I.: *See—*
Bildjukevich, Viktor L.; Turovsky, Leonid N.; Meleshko, Vyacheslav J.; Yakimovich, Dmitry T.; Lebedkova, Valentina A.; Demidovich, Boris K.; Plavnik, Gennady Z.; Dubrovsky, Nikolai N.; Proskalovich, Evgeny A.; and Pivovarov, Alexandr I., 4,421,594., Cl. 159-4.00R.

Planet Products Inc.: *See—*
Stuermer, Karl H., 4,421,222., Cl. 198-382.000.

Plant, Derek, to Scott Paper Company. Method of making a bonded corrugated nonwoven fabric and product made thereby. 4,421,812., Cl. 428-152.000.

Plasson Maagan Michael Industries Ltd.: *See—*
Kantor, Itzhak, 4,421,347., Cl. 285-369.000.
Shomer, Yair, 4,421,061., Cl. 119-81.000.

Plastics Engineering Company: *See—*
Lee, Chung J., 4,421,905., Cl. 528-56.000.

Platt, Clark I.: *See—*
Brenner, Robert A.; Clearman, Jack F.; and Platt, Clark I., 4,420,952., Cl. 68-53.000.
Clearman, Jack F.; Hageman, James R.; and Platt, Clark I., 4,420,951., Cl. 68-17.00R.

Plavnik, Gennady Z.: *See—*
Bildjukevich, Viktor L.; Turovsky, Leonid N.; Meleshko, Vyacheslav J.; Yakimovich, Dmitry T.; Lebedkova, Valentina A.; Demidovich, Boris K.; Plavnik, Gennady Z.; Dubrovsky, Nikolai N.; Proskalovich, Evgeny A.; and Pivovarov, Alexandr I., 4,421,594., Cl. 159-4.00R.

Pleass, Charles M. Linking sailboards. 4,421,491., Cl. 441-74.000.

Pleass, Charles M.: *See—*
Hicks, Douglas C.; and Pleass, Charles M., 4,421,461., Cl. 417-53.000.

Plueddemann, Edwin P., to Dow Corning Corporation. Metal extraction from solution and novel compounds used therefor. 4,421,654., Cl. 210-698.000.

Poad, William J.; De Santis, Urbano J.; and McFadden, Lewis W., to Brockway Glass Company, Inc. Automatic glassware forming machine with automatic down and/or stuck ware rejection. 4,421,542., Cl. 65-158.000.

Poad, William J.: *See—*
Dembicki, Michael T.; and Poad, William J., 4,421,580., Cl. 156-69.000.

Pocal Industries, Inc.: *See—*
Carter, Harry R.; and Carter, Randall R., 4,421,031., Cl. 102-252.000.

Podgorny, Anatoly N.: *See—*
Mischenko, Anatoly I.; Talda, Gennady B.; Belogub, Alexandr V.; Podgorny, Anatoly N.; Makarov, Alexandr A.; Zhemerenko, Anatoly T.; Domrachev, Anatoly I.; and Efremov, Petr K., 4,421,072., Cl. 123-1.00A.

Podgorski, Theodore J., to Honeywell Inc. Stress-free window for laser applications. 4,421,386., Cl. 350-319.000.

Pokrzyk, Gerald F.: *See—*
Stachurski, John Z. O.; Pouli, Dirk; Ripa, John A.; and Pokrzyk, Gerald F., 4,421,626., Cl. 204-290.00R.

Pollich, Gerhard, to Heidelberger Druckmaschinen AG. Delivery table for sheet-fed printing presses. 4,421,028., Cl. 101-240.000.

Pollock, Lyle W., to Phillips Petroleum Company. Process for preparing iron-containing refractory balls for retorting oil shale. 4,421,701., Cl. 264-60.000.

Polymex Pty. Limited: *See—*
Trimmer, Raymond W.; and McCullagh, Morris B., 4,420,863., Cl. 29-121.500.

Ponghis, Nikolas; Poos, Arthur; and Vidal, Roland, to Centre de Recherches Metallurgiques. Process for operating a blast furnace. 4,421,553., Cl. 75-41.000.

Pongrass, Robert G.; and Rutter, Christopher C. Self-closing fluid dispensing valves. 4,421,297., Cl. 251-310.000.

Ponticello, Ignazio S.; Hollister, Kenneth R.; and Tuites, Richard C., to Eastman Kodak Company. Polymerizable ethylenically unsaturated amide compounds. 4,421,915., Cl. 544-387.000.

Poos, Arthur: *See—*
Ponghis, Nikolas; Poos, Arthur; and Vidal, Roland, 4,421,553., Cl. 75-41.000.

Porcina, John R. Security apparatus and method for a self-service fuel pumping station. 4,421,248., Cl. 222-25.000.

Portilla, Mario. Automated thread trimming apparatus for use for sewing machines. 4,421,045., Cl. 112-288.000.

Posnansky, Mario; and Kriesi, Ruedi. Process and apparatus for heating a transparent, gaseous medium by means of concentrated solar radiation. 4,421,102., Cl. 126-438.000.

Possati, Mario; Golinelli, Guido; and Selleri, Narciso, to Finike Italiana Marposs S.p.A. Plug comparator for checking the diameter of holes. 4,420,889., Cl. 33-178.00F.

Postlethwaite, Darrell M.: *See—*
Dickey, Fred M.; and Postlethwaite, Darrell M., 4,421,409., Cl. 356-354.000.

Postupack, Dennis S., to PPG Industries, Inc. Method for repairing silver image glass photomasks with Ni. 4,421,836., Cl. 430-5.000.

Pott, Ronald W.: *See—*
Grimm, William G.; and Pott, Ronald W., 4,421,302., Cl. 256-67.000.

Potter, Robert M.; Archuleta, Jacobo R.; and Fink, Conrad F. Apparatus and method for downhole injection of radioactive tracer. 4,421,982., Cl. 250-260.000.

Pouli, Dirk: *See—*
Stachurski, John Z. O.; Pouli, Dirk; Ripa, John A.; and Pokrzyk, Gerald F., 4,421,626., Cl. 204-290.00R.

Pounds, Walter R., to KB Denver, Inc. Keyboard elastomeric cover with buttons having changeable legends. 4,421,966., Cl. 200-309.000.

PPG Industries, Inc.: *See—*
Kaylo, Alan J.; and Castellucci, Nicholas T., 4,421,620., Cl. 204-181.00C.
Postupack, Dennis S., 4,421,836., Cl. 430-5.000.

PQ Corporation: *See—*
Sands, Bruce W., 4,421,562., Cl. 106-75.000.

Prader, Randolph D., to Mobil Oil Corporation. Slip-resistant shipping sacks. 4,421,805., Cl. 428-35.000.

Pratt, George W., Jr., to Massachusetts Institute of Technology. Apparatus for establishing in vivo, bone strength. 4,421,119., Cl. 128-660.000.

Pratt, Thomas A. Bicycle with resiliently yieldable wheel supports. 4,421,337., Cl. 280-277.000.

Praxl, Werner O.: *See*—
Friemel, Wolfgang F. R.; and Praxl, Werner O., 4,421,742., Cl. 424-128.000.

Precision Handling Devices, Inc.: *See*—
Hubbard, Leo J., 4,421,261., Cl. 226-74.000.

Pressbau GmbH: *See*—
Koehne, Rainer, 4,421,797., Cl. 427-403.000.

Presto Lock, Inc.: *See*—
Remington, Richard C., 4,420,953., Cl. 70-74.000.

Price, Keith; and Mathews, Michael, to Monsanto Europe S.A. Instrument and method for control testing of vulcanized rubber. 4,421,424., Cl. 374-48.000.

Priebe, Edmund: *See*—
McKee, Graham E.; Brandstetter, Franz; Echte, Adolf; Hambrecht, Juergen; Overhoff, Heinz-Juergen; Priebe, Edmund; Schwaab, Josef; and Siebel, Peter, 4,421,875., Cl. 523-335.000.

Prince Corporation: *See*—
Marcus, Konrad H., 4,421,355., Cl. 296-97.00H.

Prisbylla, Michael P., to Stauffer Chemical Company. 4-Hydroxy-5-isopropyl-2-methylphenyl trimethylammonium, 1-piperidine carboxylate salt of N-phosphonomethylglycine and its use as a herbicide. 4,421,547., Cl. 71-86.000.

Pro-Eco Limited: *See*—
Rippin, John W., 4,421,283., Cl. 242-56.900.

Procter & Gamble Company, The: *See*—
Bish, Steven S.; Sagel, Paul J.; and Trinh, Toan, 4,421,809., Cl. 428-90.000.
Dixon, Thomas J.; and Kelm, Gary R., 4,421,769., Cl. 424-358.000.
Leonard, Edward F., 4,421,818., Cl. 428-222.000.

Progressive Blasting Systems, Inc.: *See*—
Weber, Joseph H., 4,420,957., Cl. 72-1.000.

Propster, John A.: *See*—
Williams, Barry E.; Evans, Norol T.; and Propster, John A., 4,422,074., Cl. 343-5.0CF.

Proskalovich, Evgeny A.: *See*—
Bildjukevich, Viktor L.; Turovsky, Leonid N.; Meleshko, Vyacheslav J.; Yakimovich, Dmitry T.; Lebedkova, Valentina A.; Demidovich, Boris K.; Plavnik, Gennady Z.; Dubrovsky, Nikolai N.; Proskalovich, Evgeny A.; and Pivovarov, Alexandr I., 4,421,594., Cl. 159-4.00R.

Pryor, Roger W., to Pitney Bowes Inc. Semiconductor strain gauge. 4,422,063., Cl. 338-2.000.

Pryputsch, Gunter G.; Leila, Lennox M.; Parkinson, Gerald E.; and Arneson, Leonard A., to Omega Air Flow-21, Ltd. Forced convection oven. 4,421,018., Cl. 99-447.000.

Puckett, William E.; Baird, Wanda F.; and Chappell, Richard C., to Rapid Fit Enterprises, Inc. Vandal resistant drain stopper. 4,420,844., Cl. 4-295.000.

Pugh, Charles D., to Burlington Industries, Inc. Filling stop identification for looms. 4,421,144., Cl. 139-370.200.

Puri, Yogi K.; and Selbo, Keith M. A., to International Business Machines Corporation. High speed line driver with ground output capability. 4,421,994., Cl. 307-200.00B.

Purkis, Ronald E.: *See*—
Grafton, David A.; Hochberg, Eric B.; and Purkis, Ronald E., 4,422,181., Cl. 455-606.000.

Puskas, Imre; and James, David E., to Standard Oil Company (Indiana). Process for preparation of palladium on carbon catalysts used in the purification of crude terephthalic acid. 4,421,676., Cl. 502-185.000.

Pyrenco, Inc.: *See*—
Chittick, Donald E., 4,421,524., Cl. 48-209.000.

Quaderer, Hans, to Balzers Aktiengesellschaft. Rectangular target plate for cathode sputtering apparatus. 4,421,628., Cl. 204-298.000.

Quinn, George J.: *See*—
Gunter, John B.; Quinn, George J.; Shields, Edward P.; Thomas, Burton S.; and Winkler, Clifford J., 4,421,715., Cl. 376-245.000.

R & B Machine Tool Company: *See*—
Martin, Merritt W., Jr., 4,421,472., Cl. 425-527.000.

R. V. Constructions Electriques: *See*—
Challet, Jacques S., 4,422,124., Cl. 361-260.000.

Racal-Dana Instruments Limited: *See*—
Brewerton, David; and Connell, Peter P. R., 4,422,053., Cl. 332-16.00R.

Racal-Vadic, Inc.: *See*—
Bingham, John A. C.; and Kurzweil, Jack H., 4,422,175., Cl. 375-14.000.

Raden, Daniel S.: *See*—
Arbir, Francis W.; Raden, Daniel S.; Narducy, Kenneth W.; and Casati, Francois M., 4,421,673., Cl. 502-167.000.
Arbir, Francis W.; Raden, Daniel S.; and Narducy, Kenneth W., 4,421,869., Cl. 521-126.000.

Radomirov, Radomir V.; Kolev, Kolyo R.; Enchev, Encho M.; and Ivanov, Ivan N., to Nauchno Proizvodstven Kombinat Po Robotika "Beroe". Method for readout form multiscale encoders and a multiturn absolute angle-code converter. 4,422,065., Cl. 340-347.00P.

Raider, Jerry W.; and Ward, Earl D., II, to International Business Machines Corporation. Method of testing stepping motors. 4,422,040., Cl. 324-158.0MG.

Raleigh, William F.; and Keegan, Patrick J., to Teledyne Industries, Inc. Electronic temperature control. 4,421,270., Cl. 236-20.00R.

Ralston Purina Company: *See*—
Graham, Paul M.; and Krinski, Thomas L., 4,421,564., Cl. 106-154.00R.

Randomatic Data Systems, Inc.: *See*—
Cross, Laurence A., Jr., 4,421,237., Cl. 209-612.000.

Rao, Vemulapalli D. N., to Ford Motor Company. Method of making wear resistant ferrous based parts. 4,421,717., Cl. 419-27.000.

Rapid Fit Enterprises, Inc.: *See*—
Puckett, William E.; Baird, Wanda F.; and Chappell, Richard C., 4,420,844., Cl. 4-295.000.

Rapisarda, Anthony A.: *See*—
Rudy, Jerome; and Rapisarda, Anthony A., 4,421,792., Cl. 427-242.000.

Rapps, Peter; and Drews, Ulrich, to Robert Bosch GmbH. Device for flowthrough rate measurement in an internal combustion engine. 4,420,971., Cl. 73-118.000.

Rask, Dean R.: *See*—
Bassett, William W.; and Rask, Dean R., 4,421,268., Cl. 236-10.000.

Raskin, Seymour H. Force measurement device. 4,420,985., Cl. 73-862.660.

Rasmussen, Ole-Bendt. Perforated drainpipe and method of making same. 4,421,810., Cl. 428-109.000.

Ratchford, Lloyd G.; and Werth, Dee A., to Bendix Corporation, The. Electrical connector having means for sealing against moisture. 4,421,373., Cl. 339-94.00M.

Rathert, Rolf: *See*—
Vaubel, Gert; Rathert, Rolf; and Ritter, Alfred, 4,421,156., Cl. 165-1.000.

Raue, Karl M.; and von Danwitz, Hans-Otto, to Spanset Inter AG. Loop as well as sling formed thereof or loop mat formed thereof. 4,421,352., Cl. 294-74.000.

Raychem Corporation: *See*—
Horsma, David A.; and Diaz, Stephen H., 4,421,582., Cl. 156-86.000.

Rayner, Maxwell A. Modular planting apparatus. 4,420,902., Cl. 47-66.000.

Raytheon Company: *See*—
Clawson, Lawrence G., 4,420,943., Cl. 62-81.000.
Osepchuk, John M., 4,421,968., Cl. 219-10.55F.

RCA Corporation: *See*—
Curtis, Bernard J.; and Ebnoether, Martin, 4,421,593., Cl. 156-643.000.
Henderson, John G. N., 4,422,096., Cl. 358-191.100.
Jolly, Stuart T., 4,421,576., Cl. 148-175.000.
Kressel, Henry; and Hsu, Sheng T., 4,422,161., Cl. 365-200.000.
Lewis, Henry G., Jr.; and Acampora, Alfonse, 4,422,094., Cl. 358-37.000.
Lin, Peter T., 4,421,798., Cl. 427-421.000.
Yorkanis, Bernard J.; and Sepp, Walter E., 4,422,052., Cl. 330-295.000.

Reed Tubular Products Co.: *See*—
Haygood, Jerry, 4,420,865., Cl. 29-402.190.

Reeve, Douglas W., to Erco Industries Limited. Bleaching procedure using chlorine dioxide and chlorine solutions. 4,421,598., Cl. 162-88.000.

Reichardt, Manfred; Pieper, Christian; Nogaj, Alfred; Sandhu, Surinder S.; and Gartner, Eckhard, to Bayer Aktiengesellschaft. Process for the production of high-strength filaments from dry-spun polyacrylonitrile. 4,421,708., Cl. 264-206.000.

Reick, Franklin G., to Ebert, Michael. Halocarbon-soluble molybdenum composition. 4,421,658., Cl. 252-32.70E.

Reiling, Karl: *See*—
Reiling, Reinhold; and Reiling, Karl, 4,420,908., Cl. 51-170.00T.

Reiling, Reinhold; and Reiling, Karl. Buffing wheel. 4,420,908., Cl. 51-170.00T.

Reily, William S., to United States Gypsum Company. Method of treatment for plaster articles to improve wear and water resistance and article of manufacture. 4,421,704., Cl. 264-133.000.

Reimann, Horst: *See*—
Lehner, August; Werther, Heinz U.; Naegele, Dieter; Lenz, Werner; Jun, Mong-Jon; Reimann, Horst; and Eckell, Albrecht, 4,421,840., Cl. 430-273.000.

Reinmold, Heinz-Josef; Mucha, Horst; and Arnoldi, Wilhelm, to Saint Gobain Vitrage. Process and apparatus for the correction of the control program of an automatic glass sheet cutting machine. 4,422,149., Cl. 364-473.000.

Reliance Electric Company: *See*—
Baumbach, Bertram W., 4,422,121., Cl. 361-119.000.
DeLeu, Robert P.; and Thompson, Robert G., 4,421,498., Cl. 474-182.000.

Re Mine, Walter J.: *See*—
Whitler, John W.; and Re Mine, Walter J., 4,421,121., Cl. 128-731.000.

Remington, Richard C., to Presto Lock, Inc. Combination locks. 4,420,953., Cl. 70-74.000.

Remostet, Jean, to ASA S.A. Twisting spindle driven by an individual electric motor. 4,420,926., Cl. 57-100.000.

Rengo Co., Ltd.: *See*—
Tokuno, Masateru; and Sawada, Tetsuya, 4,420,998., Cl. 83-328.000.

Research Association for Residual Oil Processing: *See*—
Murakami, Tadashi; Suzuka, Teruo; Inoue, Yukio; and Aizawa, Shirou, 4,421,635., Cl. 208-112.000.

Resonant Technology Company: *See*—
Gurries, Raymond A., 4,420,963., Cl. 72-407.000.

Reul, Joseph A.: *See—*
Allen, Edwin; Dillarstone, Alan; and Reul, Joseph A., 4,421,657., Cl. 252-8.600.

Revak, Timothy T.; and Krueger, Robert T., to Dow Chemical Company, The. Membrane system for intermittent gas separation. 4,421,529., Cl. 55-16.000.

Reynolds, Robert S., to Hewlett-Packard Company. Method and apparatus for multi-track data translation on a disc. 4,422,110., Cl. 360-69.000.

Reznik, David, to Tri/Valley Growers. Continuous vacuum curing and solvent recovery coating process. 4,421,781., Cl. 427-46.000.

Rhone-Poulenc Industries: *See—*
Bonnebat, Claude; and Macabrey, Louis, 4,421,711., Cl. 264-529.000.
Fouassier, Claude; and Saubat, Bernadette, 4,422,007., Cl. 313-486.000.

Rhone-Poulenc Sante: *See—*
Baudouin, Michel; and Linares, Hubert, 4,421,918., Cl. 546-153.000.
Baudouin, Michel; and Michelet, Daniel, 4,421,920., Cl. 546-163.000.
Bluthe, Norbert; Gore, Jacques; and Malacria, Max, 4,421,934., Cl. 568-341.000.

Rhythm Watch Co., Ltd.: *See—*
Morishima, Hideki, 4,421,418., Cl. 368-69.000.

Rice, Francis J.: *See—*
Williamson, Audley B.; Banks, Stewart; and Rice, Francis J., 4,421,249., Cl. 222-88.000.

Rich Products Corporation: *See—*
Kahn, Marvin L.; and Lynch, Robert J., 4,421,778., Cl. 426-564.000.

Richardson GmbH: *See—*
Stock, Karl-Wilhelm; Brudney, Norman; and Wienecke, Horst G. P., 4,421,771., Cl. 426-94.000.

Richmond, Dennis W., to HPM Corporation. Injection molding machine diagnostic system. 4,421,467., Cl. 425-136.000.

Richter, Sabine: *See—*
Deutscher, Hans-Joachim; Richter, Sabine; Zaschke, Horst; Demus, Dietrich; and Boettger, Ute, 4,421,670., Cl. 252-299.620.

Ricketts, William H., to Muskogee Environmental Conservation Co. Method and apparatus for aligning and securing auxiliary equipment with respect to a well drilling platform. 4,420,916., Cl. 52-122.100.

Ricoh Company, Ltd.: *See—*
Nagahara, Yasumori, 4,421,405., Cl. 355-58.000.

Riel, Frank J.: *See—*
Rose, Philip M.; and Riel, Frank J., 4,421,811., Cl. 428-116.000.

Rinderle, Heinz: *See—*
Minner, Willy; Bohme, Rolf; Siegle, Martin; and Rinderle, Heinz, 4,422,033., Cl. 323-314.000.

Rinno, Helmut: *See—*
Braun, Helmut; Rinno, Helmut; and Stelzel, Werner, 4,421,889., Cl. 524-381.000.

Ripa, John A.: *See—*
Stachurski, John Z. O.; Pouli, Dirk; Ripa, John A.; and Pokrzyk, Gerald F., 4,421,626., Cl. 204-290.00R.

Rippin, John W., to Pro-Eco Limited. Strip recoiling apparatus. 4,421,283., Cl. 242-56.900.

Risko, Donald G., to Extrude Hone Corporation. Capacitance measurement probe. 4,422,035., Cl. 324-61.00P.

Ristorcelli, Joseph R., Jr.: *See—*
Mahajan, Roop L.; and Ristorcelli, Joseph R., Jr., 4,421,786., Cl. 427-82.000.

Ritch, Curtis R.: *See—*
Sewell, James H.; Gaede, Hans; and Ritch, Curtis R., 4,421,259., Cl. 223-76.000.

Ritchie, Leon T.; Snyder, Clair W., Jr.; Toeppen, Thurston H.; and Woratyla, John A., to AMP Incorporated. Method of mounting tilt latch zero insertion force connector to a substrate. 4,420,882., Cl. 29-837.000.

Ritschard, Werner: *See—*
Le Dain, Michel; and Ritschard, Werner, 4,421,653., Cl. 210-692.000.

Ritson, Carl: *See—*
Danby, Hal C.; and Ritson, Carl, 4,421,506., Cl. 604-34.000.

Ritter, Alexander S.; and Lee, James A., to Far West Botanicals, Inc. Shipping container for living botanicals. 4,420,903., Cl. 47-81.000.

Ritter, Alfred: *See—*
Vaubel, Gert; Rathert, Rolf; and Ritter, Alfred, 4,421,156., Cl. 165-1.000.

Ritter, Charles H.: *See—*
Orloff, Eugene F.; Horowitz, Martin; and Ritter, Charles H., 4,420,976., Cl. 73-304.00C.

Rivola, Giovanni: *See—*
Cassinelli, Giuseppe; Grein, Arpad; Merli, Sergio; and Rivola, Giovanni, 4,421,851., Cl. 435-78.000.

Robert Bosch GmbH: *See—*
Ahner, Peter; Harer, Helmut; and Schustek, Siegfried, 4,421,998., Cl. 310-68.00R.
Kienzle, Wolfgang; and Krauss, Rudolf, 4,421,278., Cl. 239-533.120.
Kobald, Walter, 4,420,935., Cl. 60-427.000.
Moser, Theo, 4,420,923., Cl. 53-51.000.
Muller, Alfred; and Sauer, Joseph, 4,420,994., Cl. 74-867.000.
Rapps, Peter; and Drews, Ulrich, 4,420,971., Cl. 73-118.000.
Schwarz, Albrecht, 4,422,021., Cl. 318-376.000.
Stumpe, Werner, 4,421,151., Cl. 152-417.000.

Roberts, George W.; Givens, Edwin N.; and Skinner, Ronald W., to International Coal Refining Company. Process for coal liquefaction in staged dissolvers. 4,421,630., Cl. 208-8.0LE.

Roberts, Peter M. Quick-release and positive locking mechanism for use on socket wrenches and on power and impact tools. 4,420,995., Cl. 81-60.000.

Roberts, Victor D., to General Electric Company. Integrated multistage electrical filter. 4,422,056., Cl. 333-177.000.

Robertshaw Controls Company: *See—*
Crichton, John F., 4,421,942., Cl. 136-217.000.

Robertson, David A.; and Turner, Norman L., to Varian Associates, Inc. Beam scanning method and apparatus for ion implantation. 4,421,988., Cl. 250-492.200.

Robinson, John W.: *See—*
Wilcox, Brian N.; and Robinson, John W., 4,421,001., Cl. 84-1.170.

Robinson, Richard H., Jr., to Clark Equipment Company. Upright fork lift truck. 4,421,208., Cl. 187-9.00E.

Robinson, Thomas; and Ohlsson, Willy, to Studsvik Energiteknik AB. Method and device for transmitting and receiving electro-magnetic ultrasound. 4,420,978., Cl. 73-643.000.

Robson, David P. Boomerang. 4,421,320., Cl. 273-425.000.

Rockwell International Corporation: *See—*
Alberti, Adriano, 4,421,047., Cl. 112-311.000.
Ampaya, Jaime P.; Heredy, Laszlo A.; and Kohl, Arthur L., 4,421,631., Cl. 208-8.00R.
Burkhead, Lowell E., 4,422,139., Cl. 363-21.000.
Heinz, Theodore A., 4,420,987., Cl. 74-99.00A.
Liu, Yet-Zen, 4,422,091., Cl. 357-24.000.
Schulz, David W.; and Weisert, Edward D., 4,420,958., Cl. 72-21.000.
Tuttle, Gary E., 4,421,163., Cl. 166-59.000.

Rodesch, Dale F.; and Cerracchio, Nicholas, to Video Education, Inc. Interactive system and method for the control of video playback devices. 4,422,105., Cl. 358-903.000.

Rodewald, Paul G.: *See—*
Olson, David H.; and Rodewald, Paul G., 4,421,941., Cl. 585-467.000.

Rodgers, J. Linn. Convertible sprinkler. 4,421,276., Cl. 239-273.000.

Rodriguez, Dionisio. Electrolytic coloring process. 4,421,610., Cl. 204-35.00N.

Rogers, Lynn M.: *See—*
Mehta, Gautam I.; and Rogers, Lynn M., 4,421,523., Cl. 48-197.00R.

Rogge, Karl; and Gappa, Gunther, to Bergwerksverband GmbH. Method of cyclic desorption of adsorption media loaded with adsorbates. 4,421,672., Cl. 502-55.000.

Rohm and Haas Company: *See—*
Chang, Ching-Jen; and Stevens, Travis E., 4,421,902., Cl. 526-317.000.

Rohr Industries, Inc.: *See—*
Rose, Philip M.; and Riel, Frank J., 4,421,811., Cl. 428-116.000.

Rohrberg, Roderick G.: *See—*
Duncan, John R.; Rohrberg, Roderick G.; Moyer, Ross A.; and Wright, William E., Sr., 4,421,972., Cl. 219-137.0PS.

Rohrer, Heinrich: *See—*
Binnig, Gerd; Nievergelt, Hermann; Rohrer, Heinrich; and Weibel, Edmund, 4,422,002., Cl. 310-328.000.

Rojey, Alexandre; Larue, Joseph; and Barreau, Alain, to Institut Francais du Petrole. Process for producing cold operated with phase separation. 4,420,946., Cl. 62-101.000.

Rolls-Royce Limited: *See—*
Wilkinson, Wilfred H.; Pateman, Edwin; Gale, Anthony G.; and Slinger, John, 4,421,153., Cl. 164-35.000.

Romania, Samuel R.; and Smith, Grant M., to Burroughs Corporation. Heat exchanger for integrated circuit packages. 4,421,161., Cl. 165-80.00C.

Ronen, Ram S., to Xerox Corporation. Self-aligned short channel MESFET. 4,422,087., Cl. 357-15.000.

Rope, Eugene L.: *See—*
Tricoles, Gus P.; and Rope, Eugene L., 4,422,076., Cl. 343-458.000.

Rose, Philip M.; and Riel, Frank J., to Rohr Industries, Inc. Method of manufacturing double layer attenuation panel with two layers of linear type material. 4,421,811., Cl. 428-116.000.

Ross, John, to Collectors Box, The. Rotisserie accessory for preparing fowl. 4,421,017., Cl. 99-421.00R.

Rossomme, Paul A.; Eckenrod, John J.; Kovach, Curtis W.; and Pinnow, Kenneth E., to Colt Industries Operating Corp. Austenitic stainless steel. 4,421,557., Cl. 75-125.000.

Rothenberg, Sidney: *See—*
MacKenzie, Burton T., Jr.; and Rothenberg, Sidney, 4,421,890., Cl. 524-431.000.

Rothman, Neil S., to Black & Decker Inc. Low-voltage surgical cast cutter with vacuum exhaust of debris. 4,421,111., Cl. 128-91.00A.

Rougemont, Raoul. Station for collecting wind energy. 4,421,452., Cl. 415-4.000.

Roussel Uclaf: *See—*
Martel, Jacques; Tessier, Jean; and Demoute, Jean-Pierre, 4,421,928., Cl. 560-177.000.

Ruch, Jean; and Nelles, Josef, to Accumulatorenwerke Hoppecke Carl Zoellner & Sohn GmbH & Co. KG. Combination knife-edge and areal contact lip seal for movable electrodes. 4,421,322., Cl. 277-12.000.

Rudolf, Karl; and Hessberg, Helmut, to Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung. Ammunition. 4,421,032., Cl. 102-307.000.

Rudy, Jerome; and Rapisarda, Anthony A., to Lever Brothers Company. Additives for clothes dryers. 4,421,792., Cl. 427-242.000.

Ruggeri, John R. Variable timing rotary valve for an internal combustion engine. 4,421,077., Cl. 123-190.0BD.

Ruhrkohle Aktiengesellschaft: *See—*
Weskamp, Wilhelm; Nashan, Gerd; and Stewen, Wilhelm, 4,421,604., Cl. 201-1.000.
Rushwald, Ira B.: *See—*
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Russo, Carl J.: *See—*
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Rustam, Kamil F.: *See—*
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Rutter, Christopher C.: *See—*
Pongrass, Robert G.; and Rutter, Christopher C., 4,421,297., Cl. 251-310.000.
Rutzen, Horst; and Petzold, Manfred, to Henkel KGaA. Manufacture of quaternary ammonium compounds. 4,421,932., Cl. 564-292.000.
Rytter, Tom O.: *See—*
Armstrong, A. Douglas; Bodenheimer, Vernon B.; and Rytter, Tom O., 4,421,597., Cl. 162-47.000.
S&C Electric Company: *See—*
Biller, Bruce A.; Scherer, Henry W.; and Swanson, Roy, 4,422,062., Cl. 337-171.000.
S. C. Johnson & Son, Inc.: *See—*
Burton, Colin K., 4,421,740., Cl. 424-70.000.
S. Levy, Inc.: *See—*
Hench, John E.; and Fukushima, Tom Y., 4,421,716., Cl. 376-216.000.
SAB Nife AB: *See—*
Vigerstol, Ole K., 4,422,031., Cl. 320-2.000.
Saban, John F., to Western Electric Company, Inc. Lead-receiving socket, multi-socket assembly incorporating same and method of effecting circuit interconnections therewith. 4,421,368., Cl. 339-17.0CF.
Sacchetti, Massimo; Aguzzi, Giovanni; Bianchi, Gianvittorio; and Caroprese, Giuseppe. Process for removing and recovering volatile organic substances from industrial waste gases. 4,421,532., Cl. 55-28.000.
Sacco, Giovanni M.; and Schkolnick, Mario, to International Business Machines Corporation. Thrashing reduction in demand accessing of a data base through an LRU paging buffer pool. 4,422,145., Cl. 364-300.000.
Sada, Hiroshi: *See—*
Kawai, Hisasi; Sada, Hiroshi; Igashira, Toshihiko; and Yoshinaga, Toru, 4,421,091., Cl. 123-620.000.
Safari, Ahmad; Newnham, Robert E.; Cross, Leslie E.; and Schulze, Walter A., to United States of America, Navy. Perforated PZT polymer composites. 4,422,003., Cl. 310-358.000.
Safety Research & Engineering Corp.: *See—*
Cook, Edward J., 4,421,052., Cl. 116-34.00R.
Safrit, Sam C.; and Cothran, William B., to Kayser-Roth Hosiery, Inc. Panty hose sizing form. 4,421,258., Cl. 223-75.000.
Sagara, Seiji: *See—*
Kagiura, Kazuo; Miyake, Hiroyuki; Kasama, Nobuhiro; Sagara, Seiji; Sasaki, Nobukazu; and Yonemori, Takaji, 4,421,401., Cl. 355-3.0FU.
Sagel, Paul J.: *See—*
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Saint Gobain Industries: *See—*
Eischen, Gaston; Eulenberg, Thomas; Gowert, Helmut; Grablowitz, Rainer; and Pernet, Michel, 4,421,541., Cl. 65-99.300.
Saint Gobain Vitrage: *See—*
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Saita, Harumi: *See—*
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Saito, Goro: *See—*
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Saito, Hideaki: *See—*
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Saito, Mitsuru: *See—*
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Saito, Shizuo, to Epson Corporation; and Kabushiki Kaisha Suwa Seikosha. Fluid tank and device for detecting remaining fluid. 4,422,084., Cl. 346-140.00R.
Sakai, Yoshihito: *See—*
Kimoto, Yasuo; Yamamoto, Masahiko; Tamiya, Katsunori; Sakai, Yoshihito; Komura, Akio; Honda, Shoichi; Maehata, Hidehiko; Kamada, Hiroshi; Suzaki, Tomohiko; and Inoue, Tomoya, 4,421,624., Cl. 204-209.000.
Sakakibara, Hideo: *See—*
Fujiwara, Tatsuro; Honda, Eiichi; Sakakibara, Hideo; and Hirano, Takao, 4,421,911., Cl. 536-7.100.
Sakamaki, Hisashi: *See—*
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Sakashita, Keiichi: *See—*
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Sakata, Hideo; Mizuno, Ichiro; Nakahara, Masao; and Sanpei, Takasi, to Mitutoyo Mfg. Co., Ltd. Instrument for measuring a length. 4,420,887., Cl. 33-147.00F.
Sakuma, Shinzo; Yanagisawa, Hifumi; Tokuhata, Kazuo; and Miyagawa, Hiroshi, to Kabushiki Kaisha Meidensha. Vacuum circuit breaker. 4,421,961., Cl. 200-144.00B.
Salaske, Manfred: *See—*
Bohme, Georg; Kohler, Wolfgang; and Salaske, Manfred, 4,421,445., Cl. 414-4.000.
Salisbury, Kingsley, to Shell Internationale Research Maatschappij B. V. Photoisomerization of trans-cyclopropane-nitriles. 4,421,618., Cl. 204-158.00R.
Sallmann, Alfred; and Baschang, Gerhard, to Ciba-Geigy Corporation. Substituted phenylacetic acid amide compounds. 4,421,765., Cl. 424-309.000.
Sampei, Tohru; Fujita, Naoya; Higuchi, Shigemitsu; Yamada, Masamichi; and Tomatsuri, Kouichi, to Hitachi, Ltd. Tape recorder. 4,422,108., Cl. 360-65.000.
Sampei, Tohru; Fujita, Naoya; Higuchi, Shigemitsu; Yamada, Masamichi; and Tomatsuri, Kouichi, to Hitachi, Ltd. Magnetic recording and reproducing apparatus automatically adjustable to each individual magnetic tape. 4,422,109., Cl. 360-65.000.
Sandhu, Surinder S.: *See—*
Reichardt, Manfred; Pieper, Christian; Nogaj, Alfred; Sandhu, Surinder S.; and Gartner, Eckhard, 4,421,708., Cl. 264-206.000.
Sandmann, Herbert, to Apparatebau Rothemuhle Brandt & Kritzler GmbH. Stator sector plate for regenerative air preheater. 4,421,157., Cl. 165-4.000.
Sandoz, Inc.: *See—*
Braud, Leonard J.; and Nadelson, Jeffrey, 4,421,752., Cl. 424-248.400.
Sands, Bruce W., to PQ Corporation. Manufacturing process for hollow microspheres. 4,421,562., Cl. 106-75.000.
Sanford, Richard; and Bourdon, Normand C., to Bendix Corporation, The. Electrical contact retention insert and means for molding same. 4,421,378., Cl. 339-217.00R.
Sanifoam, Inc.: *See—*
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Sankyo Company Limited: *See—*
Kawamoto, Isao; and Nakahara, Masaki, 4,421,758., Cl. 424-273.00R.
Morisawa, Yasuhiro; Konishi, Kiyoshi; and Kataoka, Mitsuru, 4,421,766., Cl. 424-311.000.
Sano, Shigenori, to Canio Computer Co., Ltd. Digital filter device. 4,422,156., Cl. 364-724.000.
Sanpei, Takasi: *See—*
Sakata, Hideo; Mizuno, Ichiro; Nakahara, Masao; and Sanpei, Takasi, 4,420,887., Cl. 33-147.00F.
Sansha Electric Mfg. Co., Ltd.: *See—*
Shinkawa, Tsutomu; Yoshino, Akihide; Konishi, Hitoshi; Komuro, Yoshiaki; Hamada, Satoshi; and Okumura, Saburo, 4,421,152., Cl. 164-258.000.
Sanshin Industries Co., Ltd.: *See—*
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Sanyo Electric Co., Ltd.: *See—*
Hosoya, Nobukazu, 4,422,095., Cl. 358-166.000.
Shigeo, Nomura, 4,422,130., Cl. 362-183.000.
Sarin, Vinod K.; Buljan, Sergej-Tomislav; and D'Angelo, Charles, to GTE Laboratories Incorporated. Alumina coated composite silicon nitride cutting tools. 4,421,525., Cl. 51-295.000.
Sarin, Vinod K.: *See—*
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Sasaki, Masahiro, to Nissan Motor Co., Ltd. Starting auxiliary device for internal combustion engine. 4,421,076., Cl. 123-179.00L.
Sasaki, Nobukazu: *See—*
Kagiura, Kazuo; Miyake, Hiroyuki; Kasama, Nobuhiro; Sagara, Seiji; Sasaki, Nobukazu; and Yonemori, Takaji, 4,421,401., Cl. 355-3.0FU.
Sasazima, Junnosuke: *See—*
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Sato, Katsumi: *See—*
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Sato, Kazuo: *See—*
Ito, Keiichi; Yamaguchi, Nobuyuki; Hayashi, Kazuhiko; Asami, Ken; Sato, Kazuo; and Ochini, Takeshi, 4,421,192., Cl. 180-179.000.
Sato, Masaaki: *See—*
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Sato, Shiro: *See—*
Nagata, Koji; Nishikawa, Mamoru; and Sato, Shiro, 4,421,790., Cl. 427-236.000.
Sato, Tadashi; Tsunoi, Haruo; and Kishi, Hirotoshi, to Canon Kabushiki Kaisha. Original image projecting apparatus. 4,421,403., Cl. 355-8.000.
Saubat, Bernadette: *See—*
Fouassier, Claude; and Saubat, Bernadette, 4,422,007., Cl. 313-486.000.

Sauer, Joseph: *See*—
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Saum, Arthur M., to Saum Enterprises, Inc. Orifice metering fan device. 4,420,969., Cl. 73-40.000.
Saum Enterprises, Inc.: *See*—
Saum, Arthur M., 4,420,969., Cl. 73-40.000.
Savage, Don H. Apparatus for dispensing hard ice cream and the like. 4,420,948., Cl. 62-340.000.
Sawada, Hiroyuki: *See*—
Umemura, Sumio; Fujii, Kozo; Nishihira, Keigo; Sawada, Hiroyuki; Tanaka, Shuji; Nakai, Mamoru; Yoshida, Hiroshi; and Kuroki, Yoshiaki, 4,421,925., Cl. 549-372.000.
Sawada, Tetsuya: *See*—
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Sawasaki, Takashi: *See*—
Nojiri, Akio; Sawasaki, Takashi; Noguchi, Isamu; Onobori, Shinji; and Sasazima, Junnosuke, 4,421,867., Cl. 521-82.000.
Sawazaki, Norikazu, to Tokyo Shibaura Denki Kabushiki Kaisha. Magnetic transcription-recording method. 4,422,106., Cl. 360-17.000.
Sawicki, Robert A., to Texaco Inc. Process. 4,421,675., Cl. 502-150.000.
Schaper, Hartwig; and Wilhelm, Karl H., to U.S. Philips Corporation. Electrochemical luminescent cell. 4,422,006., Cl. 313-483.000.
Schatzberg, Paul: *See*—
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Scheepers, Joseph G. B., to Maascom B.V.; and Laura Metaal B.V. Process and apparatus for applying pile planking. 4,421,440., Cl. 405-282.000.
Scheffer, Bruce A. Web folding apparatus. 4,421,501., Cl. 493-439.000.
Scheibe, Adolf, to Siemens Aktiengesellschaft. Method of producing a monolithically integrated two-transistor memory cell in accordance with MOS technology. 4,420,871., Cl. 29-571.000.
Scherer, Henry W.: *See*—
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Schinke, Franz, to U.S. Philips Corporation. Nozzle for applying a liquid to the intermediate image carrier of an electrophoretic printer. 4,421,056., Cl. 118-645.000.
Schkolnick, Mario: *See*—
Sacco, Giovanni M.; and Schkolnick, Mario, 4,422,145., Cl. 364-300.000.
Schlapman, William J.; and Gault, Roger T., to J. I. Case Company. End drive rotary cultivator. 4,421,177., Cl. 172-63.000.
Schleimer, Francois: *See*—
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Schluchter, Martin; and Schroder, Paul, to BBC Brown, Boveri & Company, Limited. Device to compensate for critical speeds of machines. 4,421,291., Cl. 248-635.000.
Schmadel, Edmund: *See*—
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Schmid, Rolf: *See*—
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Schmidt, Kurt; and Jentzsch, Klaus, to Kernforschungszentrum Karlsruhe Gesellschaft mit beschrankter Haftung. Liquid helium pump. 4,421,464., Cl. 417-412.000.
Schmidt, Lawrence R.; and Lovgren, Eric M., to General Electric Company. Method for making polyetherimide. 4,421,907., Cl. 528-128.000.
Schmidt, Manfred: *See*—
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Schmitt, Frederick L.: *See*—
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Schmoock, Roy F., to Fischer & Porter Company. Unitary electromagnetic flowmeter with sealed coils. 4,420,982., Cl. 73-861.120.
Schmuck, Philip W.: *See*—
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Schneider, Barry L.; and Beddow, David V., to Hollister Incorporated. Leg bag for urinary incontinence. 4,421,509., Cl. 604-317.000.
Schneider, Richard T.; and Hauck, Frederick A. Battery having replaceable electrodes. 4,421,830., Cl. 429-49.000.
Schneider, Rolf: *See*—
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Schoen, Otmar, to Flutec Fluidtechnische Geraete GmbH. Manometer switching valve. 4,420,981., Cl. 73-756.000.
Schoenberg, Steve; and Ellis, David G., to Digitronics Inventionering Corp. Spraying apparatus. 4,421,800., Cl. 427-424.000.
Schoendorfer, Donald W.: *See*—
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Schoenmaker, John: *See*—
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Schon, Romuald; Doms, Manfred; Vorberg, Peter; and Schroter, Horst. Displacement system for an opthalmologic examination unit. 4,421,394., Cl. 351-245.000.
Schonemann, Otto: *See*—
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Schrederhof, Antonie: *See*—
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Schroter, Horst: *See*—
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Schulte, Heinz: *See*—
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Schultz, Ronald W.; and Graham, Donald R., to Allied Corporation. Biological tissue cassette. 4,421,246., Cl. 220-307.000.
Schulz, David W.; and Weisert, Edward D., to Rockwell International Corporation. Method and apparatus for regulating preselected loads on forming dies. 4,420,958., Cl. 72-21.000.
Schulz, Johan G.: *See*—
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Schulze, Walter A.: *See*—
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Schustek, Siegfried: *See*—
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Schuurman, Eiko A. Alternative liquid fuel injection system and method. 4,421,087., Cl. 123-445.000.
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Schwartz, Nathan H. Wound irrigation system. 4,421,505., Cl. 604-28.000.
Schwarz, Albrecht, to Robert Bosch GmbH. Electric motor dynamic braking energy recuperating system. 4,422,021., Cl. 318-376.000.
Schweinsberg, Bernhard: *See*—
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Scott, Donald R.: *See*—
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Scott & Fetzer Company, The: *See*—
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Sebesteny, Peter, to Ideal Toy Corporation. Puzzle-cube. 4,421,311., Cl. 273-153.00S.
Sedco, Inc.: *See*—
Hammett, Dillard S., 4,421,051., Cl. 114-264.000.
Seefluth, Charles L., to Phillips Petroleum Company. Polymer slurry washing. 4,421,874., Cl. 523-315.000.
Seemuth, Paul D., to Ethyl Corporation. Diesel fuel composition. 4,421,522., Cl. 44-53.000.
Seeney, Charles E.; Kraemer, John F.; and Varnum, Nancy C., to International Minerals & Chemical Corp. Oxidatively coupled cold-set binders. 4,421,873., Cl. 523-145.000.
Seikagaku Kogyo Co., Ltd.: *See*—
Nagasawa, Kinzo; and Ogamo, Akira, 4,421,650., Cl. 210-635.000.
Seikosha Co., Ltd.: *See*—
Chida, Yoshinori; and Tada, Satoru, 4,421,262., Cl. 226-79.000.
Seiler, Alfred J. Tube connector. 4,421,346., Cl. 285-346.000.
Seilly, Alec H., to Lucas Industries Limited. Fuel system for compression ignition engine. 4,421,088., Cl. 123-447.000.
Seino, Minoru: *See*—
Matsumoto, Yoshikane; Kobayashi, Tsuneki; Kurosawa, Makoto; and Seino, Minoru, 4,421,430., Cl. 400-121.000.
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Seki, Shojiro: *See*—
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Selby, Thomas P.; and Wolf, Anthony D., to Du Pont de Nemours, E. I., and Company. Herbicidal triazole ureas. 4,421,550., Cl. 71-92.000.

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Sellmeyer, Daniel J., to Gulf & Western Industries, Inc. System for automatically releasing parking brakes. 4,421,214., Cl. 192-4.00A.
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Seno, Mitsuru, to Tokyo Shibaura Deski Kabushiki Kaisha. Turntable apparatus. 4,422,170., Cl. 369-270.000.
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Sewell, James H.; Gaede, Hans; and Ritch, Curtis R., to Intech Corporation. Method and apparatus for handling hosiery. 4,421,259., Cl. 223-76.000.
Shaffer, John W., to GTE Products Corporation. Tungsten-halogen incandescent lamp containing additive to reduce filament sag. 4,422,009., Cl. 313-579.000.
Shajenko, Peter, to United States of America, Navy. Wide-area acousto-optic hydrophone. 4,422,167., Cl. 367-149.000.
Shamoto, Kunio: *See*—
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Blytas, George C., 4,421,733., Cl. 423-573.00R.
Langner, Carl G., 4,421,437., Cl. 405-166.000.
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Verbrugge, Pieter A., 4,421,935., Cl. 568-343.000.
Shen, Jacob, to Standard Oil Company (Sohio). Selective hydrogen-deuterium interchange using ion exchange resins. 4,421,865., Cl. 521-31.000.
Shenvi, Ashokkumar B., to Du Pont de Nemours, E. I., and Company. Intermediates for octahydrobenzofuro[3,2-e]isoquinolines. 4,421,916., Cl. 546-14.000.
Shepherd, Frank R.; and Westwood, William D., to Northern Telecom Limited. Thin film transistors. 4,422,090., Cl. 357-23.000.
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Shibata, Takuo; Izuta, Mitsugu; and Matano, Tetsuya, to Toyota Jidosha Kabushiki Kaisha. Transmission with alignable bearing supporting longer power output shaft of differential. 4,421,187., Cl. 180-73.00D.
Shibuya Machine Company Ltd.: *See*—
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Shimano, Keizo, to Shimano Industrial Company Limited. Saddle support device for a bicycle. 4,421,357., Cl. 297-195.000.
Shimizu, Shigeki; and Oshima, Akinobu, to Mitsubishi Chemical Industries Limited. Photosensitive lithographic plate with sulfonate containing photosensitive polyester. 4,421,841., Cl. 430-285.000.
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Shivar, Irving. Cleaning and degreasing composition. 4,421,680., Cl. 252-526.000.
Shoji, Masakazu, to Bell Telephone Laboratories, Incorporated. Microprocessor architecture for improved chip testability. 4,422,141., Cl. 364-200.000.
Shomer, Yair, to Plasson Maagan Michael Industries Ltd. Suspension-type poultry drinking fountain. 4,421,061., Cl. 119-81.000.
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Sich, Mirko H. Cooking apparatus. 4,421,016., Cl. 99-402.000.
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Sim Kar Lighting Fixture Co., Inc.: *See—*
Trowbridge, Charles A., 4,422,132., Cl. 362-220.000.

Simenfalvi, Laszlo: *See—*
Czeiler, Andras; Kallai, Istvan; and Simenfalvi, Laszlo, 4,421,803., Cl. 428-35.000.

Simmons, Raymond W.: *See—*
Clanton, Richard A.; and Simmons, Raymond W., 4,422,131., Cl. 362-186.000.

Simplex Time Recorder Co.: *See—*
Franke, George, 4,422,079., Cl. 346-1.100.

Singer Company, The: *See—*
Killinger, Karl H., 4,421,042., Cl. 112-259.000.
Kornatowski, Boleslaw; and Adams, Kenneth D., 4,421,043., Cl. 112-260.000.
Weisz, William, 4,421,041., Cl. 112-226.000.

Singer, Mark. Support structure for a piece of furniture. 4,421,356., Cl. 297-16.000.

Sinn, Adolf: *See—*
Braun, Burkhard; Vosteen, Bernhard; Skerhut, Reiner; and Sinn, Adolf, 4,420,892., Cl. 34-183.000.

Sintered Metals, Inc.: *See—*
Jaffe, Myron I., 4,421,220., Cl. 194-4.00D.

Sir Robert McAlpine & Sons (Trade Investments) Limited: *See—*
Allan, John; and Musgrove, Peter J., 4,421,458., Cl. 416-117.000.

Skerhut, Reiner: *See—*
Braun, Burkhard; Vosteen, Bernhard; Skerhut, Reiner; and Sinn, Adolf, 4,420,892., Cl. 34-183.000.

SKF Kugellagerfabriken GmbH: *See—*
Olschewski, Armin; Brandenstein, Manfred; and Walter, Lothar, 4,421,363., Cl. 308-6.00C.

Skinner, Robert T. J.: *See—*
Broadwith, Brian E.; and Skinner, Robert T. J., 4,421,084., Cl. 123-365.000.

Skinner, Ronald W.: *See—*
Roberts, George W.; Givens, Edwin N.; and Skinner, Ronald W., 4,421,630., Cl. 208-8.0LE.

Slinger, John: *See—*
Wilkinson, Wilfred H.; Pateman, Edwin; Gale, Anthony G.; and Slinger, John, 4,421,153., Cl. 164-35.000.

Smith, Brian J.: *See—*
Zemke, Wayne P.; Maki, Clyde M.; and Smith, Brian J., 4,421,435., Cl. 404-113.000.

Smith, Grant M.: *See—*
Romania, Samuel R.; and Smith, Grant M., 4,421,161., Cl. 165-80.00C.

Smith, Harry M.; and Williams, Raymond D., to FMC Corporation. Continuous alkoxidation process. 4,421,936., Cl. 568-678.000.

Smith, James P., Jr. Pallet puller. 4,421,353., Cl. 294-82.00R.

Smith, Jean E. Head warming pillow case. 4,420,847., Cl. 5-490.000.

Smith, Michael C., to Southwire Company. Fail safe air wipe. 4,421,154., Cl. 164-158.000.

Smith and Nephew Associated Companies Limited: *See—*
Gilbert, David J.; and Hollingsbee, Derek A., 4,421,741., Cl. 424-104.000.

Smith, Robert W.: *See—*
Farkas, Thomas P.; Burr, Gary D.; and Smith, Robert W., 4,420,965., Cl. 374-43.000.

Smith, Samuel C. Manually operable folding guide. 4,421,500., Cl. 493-405.000.

Smith, Stuart B., to Thermocell Development, Ltd. Polyester-melamine thermosetting foam and method of preparation. 4,421,868., Cl. 521-112.000.

SmithKline Instruments, Inc.: *See—*
Dow, Julian; and Meyers, Paul F., 4,421,118., Cl. 128-660.000.

Smithline, Leonard M.; and Wolga, George J., to Lansing Research Corporation. Temperature compensation of tunable acoustic optical filters. 4,422,154., Cl. 364-571.000.

Snyder, Clair W., Jr.: *See—*
Ritchie, Leon T.; Snyder, Clair W., Jr.; Toeppen, Thurston H.; and Woratyla, John A., 4,420,882., Cl. 29-837.000.

Snyder, David E.: *See—*
Bruton, Billy R.; and Snyder, David E., 4,421,134., Cl. 137-72.000.

Sobol, Lawrence M.: *See—*
Bellah, Glen R.; Sobol, Lawrence M.; Idelman, Lloyd B.; and Thanh, Vo V., 4,421,215., Cl. 192-4.00A.

Societa' Italiana Resine S.I.R. S.p.A.: *See—*
Buzio, Pierpaolo; Edefonti, Lucio; and Argela', Gianluigi, 4,421,780., Cl. 427-40.000.

S.A. Automobiles Citroen: *See—*
Chandioux, Andre, 4,421,197., Cl. 180-258.000.

Societe Anonyme D.B.A.: *See—*
Deligny, Jean, 4,420,988., Cl. 74-501.50R.

Societe Anonyme dite: Ceraver: *See—*
Willem, Michel, 4,421,948., Cl. 174-158.00R.

s.a. PRB, societe anonyme: *See—*
Dupont, Gerard E., 4,421,033., Cl. 102-529.000.

Societe de Recherches Industrielles (S.O.R.I.): *See—*
Picart, Francois, 4,421,927., Cl. 424-248.550.

Societe en Commandite par actions dite: Chauvin Arnoux: *See—*
Arnoux, Daniel; Leconte, Andre; Genter, Claude; and Michel, Bernard, 4,420,918., Cl. 52-157.000.

Societe Nationale Elf Aquitaine (Production): *See—*
Correge, Philippe; and Gay, Lucien, 4,421,646., Cl. 210-291.000.

Soderberg, John H.; Eckert, Alton B.; and McFiggans, Robert B., to Pitney Bowes Inc. Electronic postage meter having plural computing systems. 4,422,148., Cl. 364-464.000.

Soeda, Takashi: *See—*
Goto, Takeshi; Soeda, Takashi; Asai, Nobuyoshi; and Tanaka, Akira, 4,421,693., Cl. 260-464.000.

Solar Turbines Incorporated: *See—*
Wosika, Leon R., 4,421,454., Cl. 415-117.000.

Solarek, Daniel B.: *See—*
Hasuly, Michael J.; Solarek, Daniel B.; and Jarowenko, Wadym, 4,421,566., Cl. 106-213.000.

Solartron Electronic Group Limited, The: *See—*
Wakeling, Antony J.; Thompson, Alan D.; and Sumner, Roy W., 4,421,484., Cl. 434-3.000.

Solc nee Hajna, Jitka, to Dow Chemical Company, The. Colloidal size hydrophobic polymers particulate having discrete particles of an inorganic material dispersed therein. 4,421,660., Cl. 252-62.540.

Solo de Zaldivar, Jose, to U.S. Philips Corporation. Method of manufacturing a semiconductor device. 4,420,872., Cl. 29-571.000.

Sone, Hironao: *See—*
Morishige, Morio; and Sone, Hironao, 4,421,419., Cl. 368-73.000.

Sonnenberg, Berthold. Self-dumping bin. 4,421,448., Cl. 414-411.000.

Sony Corporation: *See—*
Akagiri, Kenzo; and Katakura, Masayuki, 4,422,049., Cl. 330-134.000.
Katakura, Masayuki; and Akagiri, Kenzo, 4,422,051., Cl. 330-278.000.
Mita, Satoshi; Tanaka, Kouichi; Nakano, Yoshitomo; Saita, Harumi; and Nakayama, Akira, 4,421,954., Cl. 179-6.130.

Southwire Company: *See—*
Hesterlee, Jerry M., 4,421,304., Cl. 266-103.000.
Smith, Michael C., 4,421,154., Cl. 164-158.000.

SP Industries, Inc.: *See—*
Sturm, William I., 4,421,289., Cl. 248-246.000.

Spanset Inter AG: *See—*
Raue, Karl M.; and von Danwitz, Hans-Otto, 4,421,352., Cl. 294-74.000.

Spash, John L., to Digital Equipment Corporation. Lightweight dual head support assembly for magnetic disk drives. 4,422,115., Cl. 360-104.000.

Spawn Mate, Inc.: *See—*
Holtz, R. Barry, 4,421,543., Cl. 71-5.000.

Spector, Donald. Wall-mounted aromatic liquid dispenser assembly. 4,421,254., Cl. 222-180.000.

Spector, George: *See—*
Delgado, Pedro R.; and Spector, George, 4,421,312., Cl. 273-236.000.

Sperry Corporation: *See—*
Kroger, Harry, 4,421,785., Cl. 427-63.000.
McMahon, Donald H., 4,421,384., Cl. 350-96.290.

Spicer, William E., to Leland Stanford, Junior University, The Board of Trustees of the. Method for making Schottky barrier diodes with engineered heights. 4,421,577., Cl. 148-187.000.

Spinner, Georg. Connector for HF coaxial cable. 4,421,377., Cl. 339-177.00R.

Spire Corporation: *See—*
Armini, Anthony J.; and Nowlan, Michael J., 4,421,589., Cl. 156-382.000.

Spooner, Archer M.: *See—*
Baldwin, Dorothy M.; Oharek, Frank J.; and Spooner, Archer M., 4,421,486., Cl. 434-44.000.

Sprague, Robert A., to Xerox Corporation. Extended thin film light modulator/scanner. 4,421,387., Cl. 350-356.000.

Stachurski, John Z. O.; Pouli, Dirk; Ripa, John A.; and Pokrzyk, Gerald F., to Occidental Chemical Corporation. Binding layer for low overvoltage hydrogen cathodes. 4,421,626., Cl. 204-290.00R.

Stafford, Donald C.; and Allo, Vincent F., to Chicago Bridge & Iron Company. Shell and tube heat exchanger with removable tubes and tube sheets. 4,421,160., Cl. 165-76.000.

Stahl, Theo; and Buhler, Ulrich, to Cassella Aktiengesellschaft. Process for preparing discharge resist prints on hydrophobic textile materials. 4,421,516., Cl. 8-464.000.

Stahlwerke Peine-Salzgitter AG: *See—*
Mahn, Gustav; Nolle, Dieter; and Eulenburg, Ulrich, 4,421,554., Cl. 75-52.000.

Stal-Laval Turbin A.B.: *See—*
Brannstrom, Roine, 4,421,989., Cl. 290-40.00R.

Stal-Laval Turbine AB: *See—*
Brannstrom, Roine; and Karlsson, Lars-Erik, 4,421,036., Cl. 110-186.000.

Stancill, Roger. Board game apparatus. 4,421,314., Cl. 273-249.000.

Standard Oil Company (Indiana): *See—*
Puskas, Imre; and James, David E., 4,421,676., Cl. 502-185.000.
York, Earl D.; Rustam, Kamil F.; and Hall, Robert D., 4,421,629., Cl. 208-8.00R.

Standard Oil Company (Sohio): *See—*
Shen, Jacob, 4,421,865., Cl. 521-31.000.
Stanton, Allyn K., to Easco Corporation. Package for articles of manufacture. 4,421,230., Cl. 206-378.000.
Starai, Rudolph, to Bell & Howell Company. Servo control arrangement utilizing alternately energized light sources and a single photodetector. 4,422,026., Cl. 318-640.000.
Stauffer Chemical Company: *See—*
Prisbylla, Michael P., 4,421,547., Cl. 71-86.000.
Stavros, Anthony J., to Bethlehem Steel Corporation. Apparatus for preventing surface blemishes on aluminum-zinc alloy coatings. 4,421,054., Cl. 118-63.000.
Steer, David C.: *See—*
Cox, Roger B.; Steer, David C.; and Woodward, John R., 4,421,668., Cl. 252-174.120.
Steer, Peter L.; and Edwards, John V., to Craig Medical Products Limited. Female incontinence device. 4,421,511., Cl. 604-329.000.
Steere, Robert E., Jr., to Silicon Technology Corporation. Wafering system. 4,420,909., Cl. 51-73.00R.
Stefanatos Peter G.: *See—*
Demers, J. T. Maurice; and Stefanatos Peter G., 4,422,029., Cl. 318-753.000.
Steiger Tractor Inc.: *See—*
Martinson, William E.; and Tuchscherer, Michael A., 4,421,190., Cl. 180-90.000.
Stein, John, to Kim Hotstart Mfg. Co., Inc. Heating element assembly. 4,421,975., Cl. 249-335.000.
Steinberg, Neil I., to Du Pont de Nemours, E. I., and Company. High capacity polymer quenching on thin shell wheels. 4,421,709., Cl. 264-216.000.
Steller, Manfred, to Sulzer Brothers Limited. Control circuit. 4,422,025., Cl. 318-609.000.
Stelzel, Werner: *See—*
Braun, Helmut; Rinno, Helmut; and Stelzel, Werner, 4,421,889., Cl. 524-381.000.
Stenograph Corporation: *See—*
Michals, Richard A.; Mozer, Frank H.; and Zum Bahlen, Ralph E., 4,421,427., Cl. 400-94.000.
Stephan, Gunter; and Schundehutte, Karl H., to Bayer Aktiengesellschaft. Water-insoluble azo-purimidine pigments and their use in coloring substrates. 4,421,601., Cl. 162-162.000.
Stephan, Walter, to Fischer Gesellschaft M.B.H. Shoe comprising a system for supplying air to the interior of the shoe. 4,420,893., Cl. 36-3.00R.
Stephens, James W., to Medical Valve Corporation. Disposable plastic reciprocating valve. 4,421,296., Cl. 251-149.700.
Steube, Fritz, to AGFA-Gevaert Aktiengesellschaft. Processing arrangement for photosensitive articles including a heater and a fluid control device. 4,421,399., Cl. 354-299.000.
Stevens, Robert L.: *See—*
McEwen, Stephen N.; Stevens, Robert L.; and Benschoter, Barry R., 4,420,868., Cl. 29-460.000.
Stevens, Travis E.: *See—*
Chang, Ching-Jen; and Stevens, Travis E., 4,421,902., Cl. 526-317.000.
Stevenson, Andrew C.: *See—*
Hill, Walter A.; Stevenson, Andrew C.; and McKenna, Peter G., 4,422,022., Cl. 318-376.000.
Stewen, Wilhelm: *See—*
Weskamp, Wilhelm; Nashan, Gerd; and Stewen, Wilhelm, 4,421,604., Cl. 201-1.000.
Stice, James D., to Kalwall Corporation. Thermal energy storage system. 4,421,101., Cl. 126-436.000.
Stock, Carl R., to ACCRA Manufacturing Co. Draw stop mechanism for a compound archery bow. 4,421,093., Cl. 124-86.000.
Stock, Karl-Wilhelm; Brudney, Norman; and Wienecke, Horst G. P., to Richardson GmbH. Chocolate covered nutrient bars. 4,421,771., Cl. 426-94.000.
Stoechio-matic AG: *See—*
Frick, Adolf, 4,421,475., Cl. 431-207.000.
Stokes, Olen L., Jr.: *See—*
Laurer, George J.; and Stokes, Olen L., Jr., 4,421,978., Cl. 235-462.000.
Stoltman, Donald D., to General Motors Corporation. Engine air flow regulator. 4,421,083., Cl. 123-339.000.
Storder, Jean-Pierre H.: *See—*
Bourlet, Maurice V.; and Storder, Jean-Pierre H., 4,420,899., Cl. 42-70.00A.
Straehle, Wolfgang: *See—*
Buthe, Ingolf; Straehle, Wolfgang; Marx, Matthias; and Peters, Reinhard, 4,421,872., Cl. 521-174.000.
Straight, Jay G.: *See—*
Hocking, Paul R.; Straight, Jay G.; and Moore, Henry P., 4,421,019., Cl. 99-450.400.
Strickman, Melvyn B.: *See—*
Strickman, Robert L.; and Strickman, Melvyn B., 4,421,526., Cl. 51-296.000.
Strickman, Robert L.; and Strickman, Melvyn B., to Sherwood Research and Development Partnership. Polyurethane foam cleaning pads and a process for their manufacture. 4,421,526., Cl. 51-296.000.
Structural Rubber Products Company: *See—*
Whitlock, Jacob O., 4,421,272., Cl. 238-8.000.
Stuart, Ronald B.; and Troup, Alan G., to Northern Engineering Industries plc. Fluidized bed combustion apparatus. 4,421,063., Cl. 122-4.00D.
Studiengesellschaft Kohle mbH: *See—*
Vaubel, Gert; Rathert, Rolf; and Ritter, Alfred, 4,421,156., Cl. 165-1.000.
Studsvik Energiteknik AB: *See—*
Robinson, Thomas; and Ohlsson, Willy, 4,420,978., Cl. 73-643.000.
Staermer, Karl H., to Planet Products Inc. Apparatus for arranging workpieces in a predictable relationship and grouping. 4,421,222., Cl. 198-382.000.
Stumpe, Werner, to Robert Bosch GmbH. Tire-pressure regulating system. 4,421,151., Cl. 152-417.000.
Sturm, William I., to SP Industries, Inc. Shelf support. 4,421,289., Cl. 248-246.000.
Stutz, H. Kent: *See—*
Baker, John E.; Topor, Michael G.; Ivers, John T.; and Stutz, H. Kent, 4,421,779., Cl. 426-660.000.
Stutz, Herbert; Illers, Karl H.; Haberkorn, Herbert; and Heckmann, Walter, to BASF Aktiengesellschaft. Process for the preparation of cellular polyurethane elastomers based on 4,4'-diisocyanato-1,2-diphenylethane. 4,421,870., Cl. 521-160.000.
Subramanian, Kohur N.: *See—*
Hoffmann, James E.; and Subramanian, Kohur N., 4,421,552., Cl. 75-9.000.
Sugihara, Masanori, to Pioneer Electronic Corporation. Cassette tape player. 4,422,114., Cl. 360-96.400.
Sugimoto, Hiroshi, to Tokyo Shibaura Denki Kabushiki Kaisha. Nuclear resonance apparatus including means for rotating a magnetic field. 4,422,042., Cl. 324-313.000.
Suginaka, Shunji: *See—*
Ikeuchi, Satoru; Kanbe, Masaru; Takahashi, Jiro; Kobayashi, Ryuichiro; Suginaka, Shunji; and Mizukura, Noboru, 4,421,846., Cl. 430-559.000.
Sugino Press Co., Ltd.: *See—*
Sugino, Yosiharu, 4,421,210., Cl. 188-32.000.
Sugino, Yosiharu, to Sugino Press Co., Ltd. Wheel stop apparatus. 4,421,210., Cl. 188-32.000.
Sugita, Hiroshi: *See—*
Uemura, Morito; Kishi, Kenichi; Nakagawa, Satoshi; Kida, Shuji; and Sugita, Hiroshi, 4,421,845., Cl. 430-544.000.
Sugitani, Junichi: *See—*
Morichika, Toshiaki; Sugitani, Junichi; and Kobayashi, Takao, 4,421,558., Cl. 75-128.00E.
Sugiura, Hisao: *See—*
Nagai, Shigeki; Yorie, Takashi; Sugiura, Hisao; Hibi, Toru; Sato, Katsumi; Wada, Takuo; and Miyahara, Masahiko, 4,421,761., Cl. 424-275.000.
Sugiura, Tusneo: *See—*
Nakayama, Shozo; Kato, Kimio; Sugiura, Tusneo; Kato, Yoshio; Shugiura, Mikio; and Otu, Keiichiro, 4,420,986., Cl. 74-60.000.
Sugizaki, Iwao: *See—*
Wakao, Masato; and Sugizaki, Iwao, 4,420,888., Cl. 33-172.00R.
Suh, Kyung W.; Krueger, David C.; and Zehner, Burch E., to Dow Chemical Company, The. Method for the preparation of syrene polymer foam. 4,421,866., Cl. 521-79.000.
Sullivan, Robert P., to Combustion Engineering, Inc. Steam cooled hanger tube for horizontal superheaters and reheaters. 4,421,070., Cl. 122-510.000.
Sulzer Brothers Limited: *See—*
Steller, Manfred, 4,422,025., Cl. 318-609.000.
Sumitomo Aluminium Smelting Company, Limited: *See—*
Yamada, Koichi; Harato, Takuo; Shinya, Yasuo; and Kato, Hisakatsu, 4,421,615., Cl. 204-105.00R.
Sumitomo Chemical Company, Ltd.: *See—*
Yamada, Koichi; Harato, Takuo; Shinya, Yasuo; and Kato, Hisakatsu, 4,421,615., Cl. 204-105.00R.
Sumitomo Electric Industries, Ltd.: *See—*
Nakahara, Motohiro; Miyajiri, Tetsuo; Yoshioka, Naoki; and Kuwahara, Toru, 4,421,540., Cl. 65-3.120.
Sumitomo Light Metal Industries, Ltd.: *See—*
Nagata, Koji; Nishikawa, Mamoru; and Sato, Shiro, 4,421,790., Cl. 427-236.000.
Sumitomo Metal Industries, Ltd.: *See—*
Kudo, Takeo; Okada, Yasutaka; Moroishi, Taishi; Ikeda, Akio; Ohtani, Hiroo; and Yoshikawa, Kunihiko, 4,421,571., Cl. 148-11.50R.
Kusaba, Yoshiaki; and Hayashi, Chihiro, 4,420,961., Cl. 72-221.000.
Sumitomo, Yuji; and Kanayama, Yoshio, to Sharp Kabushiki Kaisha. Ink liquid viscosity control in an ink liquid supply system for an ink jet system printer. 4,422,085., Cl. 346-140.00R.
Summers, Christopher P., to U.S. Philips Corporation. Phase sensitive detector. 4,422,176., Cl. 375-120.000.
Summit Systems, Inc.: *See—*
Williams, David E., 4,421,310., Cl. 273-143.00R.
Sumner, John H.: *See—*
Allen, Danny H.; and Sumner, John H., 4,421,140., Cl. 139-1.00E.
Sumner, Roy W.: *See—*
Wakeling, Antony J.; Thompson, Alan D.; and Sumner, Roy W., 4,421,484., Cl. 434-3.000.
Sun, Lilla S.; and Anderson, John C., to Beckman Instruments, Inc. Noise checking method. 4,421,857., Cl. 436-2.000.
Sundelin, Kurt G. R., to International Minerals & Chemical Corp. Bipyridine substituted imidazoylidene, copper complex, and its use in food-producing animals. 4,421,751., Cl. 424-245.000.
Suzaki, Tomohiko: *See—*
Kimoto, Yasuo; Yamamoto, Masahiko; Tamiya, Katsunori; Sakai, Yoshihito; Komura, Akio; Honda, Shoichi; Maehata, Hidehiko;

Kamada, Hiroshi; Suzaki, Tomohiko; and Inoue, Tomoya, 4,421,624., Cl. 204-209.000.
Suzuka, Teruo: *See—*
Murakami, Tadashi; Suzuka, Teruo; Inoue, Yukio; and Aizawa, Shirou, 4,421,635., Cl. 208-112.000.
Suzuki, Hiroshi: *See—*
Kasahara, Hideo; Tazaki, Kichiya; Fukuda, Kunio; and Suzuki, Hiroshi, 4,421,892., Cl. 524-514.000.
Osumi, Yasuaki; Suzuki, Hiroshi; Kato, Akihiko; and Oguro, Keisuke, 4,421,718., Cl. 420-443.000.
Suzuki, Kenji, to Nippon Gakki Seizo Kabushiki Kaisha. Single-ended push-pull amplifier with two complementary push-pull circuits. 4,422,050., Cl. 330-263.000.
Suzuki, Kenzo: *See—*
Kogure, Katsushige; Suzuki, Kenzo; and Kamimura, Masami, 4,421,080., Cl. 123-306.000.
Suzuki, Masayuki: *See—*
Nishino, Hiroshi; and Suzuki, Masayuki, 4,421,533., Cl. 55-68.000.
Suzuki, Takashi; Iizuka, Kiyoshi; Ohtaka, Keiji; and Mizutani, Hidemasa, to Canon Kabushiki Kaisha. Focussing plate. 4,421,398., Cl. 354-200.000.
Suzuki, Takuya: *See—*
Furuto, Yoshio; Meguro, Shinichiro; Suzuki, Takuya; Ito, Ikuo; Ando, Toshinari; Nishi, Masataka; and Shimamoto, Susumu, 4,421,946., Cl. 174-128.00S.
Sverdlik, David; and Vodovozov, Arnold I. Adjustable rebound apparatus. 4,421,318., Cl. 273-395.000.
Swan, Charles A., to Windows, Inc. Shallow double hung window. 4,420,907., Cl. 49-446.000.
Swanson, Roy: *See—*
Biller, Bruce A.; Scherer, Henry W.; and Swanson, Roy, 4,422,062., Cl. 337-171.000.
Swapceinski, John P.: *See—*
Marsiglio, Carl M.; and Swapceinski, John P., 4,421,228., Cl. 198-814.000.
Swift, Edward R., Jr.; and Schmuck, Philip W., to Baker International Corporation. Method and apparatus for quick replacement of cartridge filters used in well fluid cleaning operations. 4,421,170., Cl. 166-312.000.
Swiss Aluminum Ltd.: *See—*
Fischer, Werner K.; and Bosshard, Ernst, 4,421,625., Cl. 204-243.00R.
Sybron Corporation: *See—*
Pietschmann, Helmut; Schmidt, Manfred; and Hirth, Emil, 4,421,483., Cl. 433-77.000.
System Development Corporation: *See—*
Galie, Louis M., 4,422,158., Cl. 364-900.000.
System Homes Company, Ltd.: *See—*
Yoshino, Hozo, 4,420,947., Cl. 62-160.000.
Szarka, David D., to Halliburton Company. Multiple stage cementer and casing inflation packer. 4,421,165., Cl. 166-151.000.
T & R Chemicals, Inc.: *See—*
Alvarez, Jose A. A., 4,421,743., Cl. 424-162.000.
Tachibana, Yoshinori: *See—*
Kuzuoka, Shinichi; Tachibana, Yoshinori; Saito, Goro; and Kitajima, Nobuyuki, 4,421,599., Cl. 162-100.000.
Tada, Satoru: *See—*
Chida, Yoshinori; and Tada, Satoru, 4,421,262., Cl. 226-79.000.
Tadmor, Zehev: *See—*
Hold, Peter; Tadmor, Zehev; and Valsamis, Lefteris N., 4,421,412., Cl. 366-76.000.
Taguchi, Kiyomi; Terada, Osamu; Morishita, Noriaki; Mihashi, Hiroshi; and Nagai, Seiji, to Nippon Kokan Kabushiki Kaisha. Method and apparatus for casting an inner lining amorphous refractory into a molten metal vessel. 4,421,697., Cl. 264-30.000.
Taguchi, Yoshio: *See—*
Yamagiwa, Satoshi; Taguchi, Yoshio; and Kayano, Masanori, 4,421,738., Cl. 424-35.000.
Taiho Pharmaceutical Company Limited: *See—*
Ito, Toshio; Ninomiya, Hiroshi; and Yamagami, Kunio, 4,421,737., Cl. 424-28.000.
Taihou Kogyo Kabushiki Kaisha: *See—*
Nakayama, Shozo; Kato, Kimio; Sugiura, Tusneo; Kato, Yoshio; Shugiura, Mikio; and Otu, Keiichiro, 4,420,986., Cl. 74-60.000.
Takada, Yoshihiro: *See—*
Yoshinaga, Yoichi; Kobayashi, Hiromi; Ueda, Shinjiro; Takada, Yoshihiro; and Nishida, Hideo, 4,421,457., Cl. 415-211.000.
Takahashi, Isao: *See—*
Irie, Toshio; Kato, Toshiyuki; and Takahashi, Isao, 4,421,573., Cl. 148-12.00F.
Takahashi, Jiro: *See—*
Ikeuchi, Satoru; Kanbe, Masaru; Takahashi, Jiro; Kobayashi, Ryuichiro; Suginaka, Shunji; and Mizukura, Noboru, 4,421,846., Cl. 430-559.000.
Takahashi, Masayuki: *See—*
Monma, Hideo; Takahashi, Masayuki; and Ishiguro, Masato, 4,422,038., Cl. 324-73.00R.
Takahashi, Toru: *See—*
Hosono, Nagao; Kinoshita, Koichi; and Takahashi, Toru, 4,421,057., Cl. 118-657.000.
Takahashi, Yoshiyuki: *See—*
Ikezawa, Hideo; Takahashi, Yoshiyuki; and Hashimoto, Hideaki, 4,421,344., Cl. 282-27.500.
Takakura, Koichi: *See—*
Nakashima, Toshihide; Tanihara, Maso; and Takakura, Koichi, 4,421,684., Cl. 260-112.00B.
Takami, Masanori: *See—*
Nakamura, Ken; Nagai, Tadashi; and Takami, Masanori, 4,421,081., Cl. 123-310.000.
Takaniemi, Tauno K. Automaton for dealing out food and drink. 4,421,364., Cl. 312-35.000.
Takao, Hiroshi: *See—*
Ikezawa, Kenji; Takao, Hiroshi; Aoki, Hiroyuki; and Kimura, Shinji, 4,421,787., Cl. 427-126.200.
Take, Yoshinari: *See—*
Yamaguchi, Kenzo; Take, Yoshinari; and Manabe, Akiyoshi, 4,421,614., Cl. 204-98.000.
Takeda Chemical Industries, Limited: *See—*
Hasegawa, Toru; Muroi, Masayuki; and Tanida, Seiichi, 4,421,687., Cl. 260-239.30B.
Inanaga, Kazutoyo; and Nagawa, Yugi, 4,421,745., Cl. 424-177.000.
Muroi, Masayuki; and Kida, Makoto, 4,421,688., Cl. 260-239.30B.
Nishino, Hiroshi; and Suzuki, Masayuki, 4,421,533., Cl. 55-68.000.
Numata, Mitsuo; Mimamida, Isao; Yamaoka, Masayoshi; Shiraishi, Mitsuru; and Miyawaki, Toshio, 4,421,912., Cl. 544-27.000.
Takeda, Keiji; Nirasawa, Mitsuharu; and Nagata, Masayoshi, to Fuji Photo Film Co., Ltd. Processes for preparing photoconductive elements and electrophotosensitive materials. 4,421,838., Cl. 430-58.000.
Takei, Masayuki, to Toppan Printing Co., Ltd. Electronic cylinder making method. 4,422,101., Cl. 358-299.000.
Takiguchi, Ryohei; and Nagashima, Masayoshi, to Dai Nippon Printing Co., Ltd.; and Tokyo Shibaura Denki Kabushiki Kaisha. Heat-sensitive and photofixing recording sheet with diazosulfonate and acidic coupling agent therefore. 4,421,839., Cl. 430-164.000.
Talda, Gennady B.: *See—*
Mischenko, Anatoly I.; Talda, Gennady B.; Belogub, Alexandr V.; Podgorny, Anatoly N.; Makarov, Alexandr A.; Zhemerenko, Anatoly T.; Domrachev, Anatoly I.; and Efremov, Petr K., 4,421,072., Cl. 123-1.00A.
Tamamura, Sadao: *See—*
Kojima, Yasuhiko; Tamamura, Sadao; Konno, Seishi; and Hashimoto, Takashi, 4,421,746., Cl. 424-195.000.
Tamiya, Katsunori: *See—*
Kimoto, Yasuo; Yamamoto, Masahiko; Tamiya, Katsunori; Sakai, Yoshihito; Komura, Akio; Honda, Shoichi; Maehata, Hidehiko; Kamada, Hiroshi; Suzaki, Tomohiko; and Inoue, Tomoya, 4,421,624., Cl. 204-209.000.
Tamura, Hideyuki: *See—*
Enoshima, Toshio; Furuhashi, Shoji; and Tamura, Hideyuki, 4,420,967., Cl. 73-35.000.
Tamura, Jun: *See—*
Matsui, Takahiro; and Tamura, Jun, 4,421,292., Cl. 251-60.000.
Tamura, Yasuyuki, to Canon Kabushiki Kaisha. Laser recording method and apparatus simultaneously scanning and reading out adjacent data. 4,422,102., Cl. 358-302.000.
Tanaka, Akira: *See—*
Goto, Takeshi; Soeda, Takashi; Asai, Nobuyoshi; and Tanaka, Akira, 4,421,693., Cl. 260-464.000.
Tanaka, Hisao: *See—*
Tsuda, Katsuhiro; Tanaka, Hisao; Nagae, Michio; and Imanaga, Yasuhiko, 4,421,885., Cl. 524-295.000.
Tanaka, Kouichi: *See—*
Mita, Satoshi; Tanaka, Kouichi; Nakano, Yoshitomo; Saita, Harumi; and Nakayama, Akira, 4,421,954., Cl. 179-6.130.
Tanaka, Osami: *See—*
Isono, Tokio; and Tanaka, Osami, 4,421,338., Cl. 280-279.000.
Tanaka, Shigeo, to Tokyo Shibaura Denki Kabushiki Kaisha. Magnetic recording and reproducing apparatus. 4,422,112., Cl. 360-77.000.
Tanaka, Shuji: *See—*
Umemura, Sumio; Fujii, Kozo; Nishihira, Keigo; Sawada, Hiroyuki; Tanaka, Shuji; Nakai, Mamoru; Yoshida, Hiroshi; and Kuroki, Yoshiaki, 4,421,925., Cl. 549-372.000.
Tanaka, Toshio: *See—*
Okamura, Noriaki; Toru, Takeshi; Oba, Takeo; Tanaka, Toshio; Bannai, Kiyoshi; Watanabe, Kenzo; Kurozumi, Seizi; Naruchi, Tatsuyuki; and Komoriya, Keiji, 4,421,914., Cl. 544-278.000.
Tanenbaum, Joseph M. Method for fabricating open web steel joists. 4,421,969., Cl. 219-107.000.
Tanida, Seiichi: *See—*
Hasegawa, Toru; Muroi, Masayuki; and Tanida, Seiichi, 4,421,687., Cl. 260-239.30B.
Tanihara, Maso: *See—*
Nakashima, Toshihide; Tanihara, Maso; and Takakura, Koichi, 4,421,684., Cl. 260-112.00B.
Taniwaki, Genshi, to Kongo Co., Ltd. Movable storage cabinet. 4,421,365., Cl. 312-198.000.
Taquoi, Jean-Pierre, to B S L (Bignier Schmid-Laurent). Container, particularly for materials in particles. 4,421,243., Cl. 220-1.500.
Tarkett AB: *See—*
Brixius, Darryl W., 4,421,561., Cl. 106-27.000.
Tate & Lyle Limited: *See—*
Daniels, Michael J.; and Farmer, Digby M., 4,421,850., Cl. 435-41.000.
Tazaki, Kichiya: *See—*
Kasahara, Hideo; Tazaki, Kichiya; Fukuda, Kunio; and Suzuki, Hiroshi, 4,421,892., Cl. 524-514.000.
Teijin, Limited: *See—*
Horie, Shigeru; Asano, Takamasa; Ichihashi, Tetsuo; and Katoh, Hideo, 4,421,887., Cl. 524-317.000.

Okamura, Noriaki; Toru, Takeshi; Oba, Takeo; Tanaka, Toshio; Bannai, Kiyoshi; Watanabe, Kenzo; Kurozumi, Seizi; Naruchi, Tatsuyuki; and Komoriya, Keiji, 4,421,914., Cl. 544-278.000.

Tekron Licensing BV: *See*—
Cunnington, Ian J.; and Evans, Harold R., 4,421,307., Cl. 272-72.000.

Tektronix, Inc.: *See*—
Meyer, William W., 4,422,019., Cl. 315-368.000.

Teledyne Industries, Inc.: *See*—
Gordbegli, Manochehr, 4,421,066., Cl. 122-264.000.
Raleigh, William F.; and Keegan, Patrick J., 4,421,270., Cl. 236-20.00R.

Tenud, Leander: *See*—
Miller, Raimund; and Tenud, Leander, 4,421,922., Cl. 549-313.000.

Terada, Osamu: *See*—
Taguchi, Kiyomi; Terada, Osamu; Morishita, Noriaki; Mihashi, Hiroshi; and Nagai, Seiji, 4,421,697., Cl. 264-30.000.

ter Burg, Antonius W. M.; and den Hoedt, Gerrit, to Akzona Incorporated. Supporting fabric for bearing bulk material and a method of building a road, dike or dam embankment. 4,421,439., Cl. 405-258.000.

Teroson GmbH: *See*—
Clausing, Rudiger; and Schunter, Werner, 4,421,807., Cl. 428-41.000.

Tessier, Jean: *See*—
Martel, Jacques; Tessier, Jean; and Demoute, Jean-Pierre, 4,421,928., Cl. 560-177.000.

Tetsu, Toyozo: *See*—
Ukai, Jun; Tetsu, Toyozo; and Shamoto, Kunio, 4,421,971., Cl. 219-128.000.

Texaco Development Corporation: *See*—
Burns, Robert B., 4,421,436., Cl. 405-60.000.
Meador, Richard A., 4,422,043., Cl. 324-338.000.

Texaco Inc.: *See*—
Duranleau, Roger G., 4,421,863., Cl. 518-701.000.
Sawicki, Robert A., 4,421,675., Cl. 502-150.000.
Waddill, Harold G.; and Sellstrom, Kathy B., 4,421,906., Cl. 528-111.000.

Texas Instruments Incorporated: *See*—
Guterman, Daniel C., 4,422,092., Cl. 357-41.000.
Guttag, Karl M., 4,422,143., Cl. 364-200.000.
Laughon, Thomas C.; and Philpott, Michael I., 4,421,487., Cl. 434-169.000.

Textilma AG: *See*—
Muller, Jakob, 4,421,142., Cl. 139-117.000.

Thaler, Warren A.: *See*—
Lundberg, Robert D.; Thaler, Warren A.; and Agarwal, Pawan K., 4,421,882., Cl. 524-31.000.
Lundberg, Robert D.; and Thaler, Warren A., 4,421,898., Cl. 525-186.000.

Thanh, Vo V.: *See*—
Bellah, Glen R.; Sobol, Lawrence M.; Idelman, Lloyd B.; and Thanh, Vo V., 4,421,215., Cl. 192-4.00A.

Theisen, Henry J.; and Gehrke, Willard H., to Curwood, Inc. Flexible wrapping material and method of manufacture. 4,421,823., Cl. 428-349.000.

Theodor Kromer GmbH & Co. KG: *See*—
Marold, Ulrich, 4,420,955., Cl. 70-303.00A.

Thermocell Development, Ltd.: *See*—
Smith, Stuart B., 4,421,868., Cl. 521-112.000.

Thermwood Corporation: *See*—
Higgins, Bobby L., 4,421,451., Cl. 414-739.000.

Thomas, Burton S.: *See*—
Gunter, John B.; Quinn, George J.; Shields, Edward P.; Thomas, Burton S.; and Winkler, Clifford J., 4,421,715., Cl. 376-245.000.

Thomas, Stephen W.; and Otis, Robert M., to Mobil Oil Corporation. Maximum likelihood estimation of the ratio of the velocities of compressional and shear waves. 4,422,165., Cl. 367-40.000.

Thompson, Alan D.: *See*—
Wakeling, Antony J.; Thompson, Alan D.; and Sumner, Roy W., 4,421,484., Cl. 434-3.000.

Thompson, Robert G.: *See*—
DeLeu, Robert P.; and Thompson, Robert G., 4,421,498., Cl. 474-182.000.

Thorne, William D.; and Patterson, William A., to International Business Machines Corporation. Spring mounted torsionally rigid print hammer mechanism. 4,421,025., Cl. 101-93.040.

Thornton, William E., to United States of America, National Aeronautics and Space Administration. Method and apparatus for simulating gravitational forces on a living organism. 4,421,109., Cl. 128-25.00R.

Thrower, Anthony, to USS Engineers and Consultants, Inc. Metal pouring nozzle with gas inlet. 4,421,257., Cl. 222-600.000.

Thuries, Edmond; Sigward, Pierre-Paul; Besson, Marcel; Van, Doan P.; and Nicoloso, Dante, to Alsthom-Atlantique. Compressed gas circuit-breaker. 4,421,962., Cl. 200-144.0AP.

Thurston, Kent W.; and Barnes, Jesse H., to Koppers Company, Inc. Half-keystone compression ring. 4,421,328., Cl. 277-216.000.

Tieleman, Rudolf J. Spray head, suited for internally cleaning slaughtered poultry. 4,421,277., Cl. 239-456.000.

Tien-Kuei, Su, to Milliken Research Corporation. Process for producing fibrillated polyester. 4,421,513., Cl. 8-130.100.

Tillequin, Jean, to Creusot-Loire. Heating equipment for an installation using steam and heated gas. 4,421,065., Cl. 122-155.00R.

Titcomb, Stanley C., to International Business Machines Corporation. Ink jet printing method and apparatus. 4,422,080., Cl. 346-1.100.

Tiwi, Peter: *See*—
Joswig, Siegfried; Liebacher, Johannes; Keils, Peter; and Tiwi, Peter, 4,420,904., Cl. 47-81.000.

TMC Corporation: *See*—
Krob, Erwin; and Bauer, Helmut, 4,421,341., Cl. 280-628.000.

Tobex Motivated Chair Company Limited: *See*—
Watkins, Cecil J.; and Watkins, Simon R., 4,421,189., Cl. 180-8.00A.

Todero, Giuseppe, to Black & Decker Inc. Power tool with improved braking device. 4,420,885., Cl. 30-381.000.

Toeppen, Thurston H.: *See*—
Ritchie, Leon T.; Snyder, Clair W., Jr.; Toeppen, Thurston H.; and Woratyla, John A., 4,420,882., Cl. 29-837.000.

Tojiki, Hitomi: *See*—
Iwasawa, Teruo; and Tojiki, Hitomi, 4,422,023., Cl. 318-384.000.

Tokitsu, Tetsuya; Harada, Saburo; Yamasaki, Jiro; and Nakama, Akihiro, to Chugai Ro. Kogyo Co., Ltd.; and Nippon Steel Corp. Ceiling beam construction for heating furnace. 4,421,480., Cl. 432-238.000.

Tokuhata, Kazuo: *See*—
Sakuma, Shinzo; Yanagisawa, Hifumi; Tokuhata, Kazuo; and Miyagawa, Hiroshi, 4,421,961., Cl. 200-144.00B.

Tokumitsu, Kiyonori: *See*—
Yamamoto, Sakuei; Inao, Hiroshi; Tokumitsu, Kiyonori; Nishida, Mitsuhiro; and Kumamoto, Sadahiro, 4,421,324., Cl. 277-24.000.

Tokuno, Masateru; and Sawada, Tetsuya, to Rengo Co., Ltd. Die cutter and die-cutting process. 4,420,998., Cl. 83-328.000.

Tokyo Institute of Technology, The President of: *See*—
Yamaguchi, Shoichiro; and Kobayashi, Fujio, 4,422,146., Cl. 364-414.000.

Tokyo Shibaura Denki Kabushiki Kaisha: *See*—
Aramaki, Yoshimitsu; and Harao, Norio, 4,422,008., Cl. 313-524.000.
Kimura, Minoru, 4,420,870., Cl. 29-571.000.
Oota, Hiroyuki; Aoshima, Terutaka; Yamamori, Kenji; and Narita, Ryuho, 4,421,974., Cl. 219-441.000.
Sawazaki, Norikazu, 4,422,106., Cl. 360-17.000.
Seno, Mitsuru, 4,422,170., Cl. 369-270.000.
Sugimoto, Hiroshi, 4,422,042., Cl. 324-313.000.
Takiguchi, Ryohei; and Nagashima, Masayoshi, 4,421,839., Cl. 430-164.000.
Tanaka, Shigeo, 4,422,112., Cl. 360-77.000.
Yamaguchi, Ryoji, 4,421,385., Cl. 350-299.000.

Tolentino, Luisito A., to General Electric Company. Process for co-alkoxylation of halosilanes and separation of the resulting products. 4,421,926., Cl. 556-471.000.

Tollar, James E., to Dow Chemical Company, The. Flat plate heat exchange apparatus. 4,421,162., Cl. 165-140.000.

Tomatsuri, Kohichi: *See*—
Sampei, Tohru; Fujita, Naoya; Higuchi, Shigemitsu; Yamada, Masamichi; and Tomatsuri, Kohichi, 4,422,109., Cl. 360-65.000.

Tomatsuri, Kouichi: *See*—
Sampei, Tohru; Fujita, Naoya; Higuchi, Shigemitsu; Yamada, Masamichi; and Tomatsuri, Kouichi, 4,422,108., Cl. 360-65.000.

Tomcufcik, Andrew S.; Meyer, Walter E.; and Dusza, John P., to American Cyanamid Company. 1-(5-Amino-4H-1,2,4-triazol-3-yl)-4-substituted-piperazines. 4,421,753., Cl. 424-250.000.

Tominari, Noboru; and Kamiyama, Shuichi, to Mikuni Kogyo Co., Ltd. Circuit for driving solenoid at high speed with choke coil. 4,422,123., Cl. 361-152.000.

Tomita, Seisuke: *See*—
Yamazaki, Noboru; Okuyama, Michio; and Tomita, Seisuke, 4,421,899., Cl. 525-189.000.

Tomren, Raymond H., to Garrett Corporation, The. Duct lining. 4,421,455., Cl. 415-119.000.

Tonne, Peter; Ludwig, Winfried; Kilpper, Gerhard; and Grimmer, Johannes, to BASF Aktiengesellschaft. Preparation of anthranilic acid amides. 4,421,931., Cl. 564-139.000.

Topor, Michael G.: *See*—
Baker, John E.; Topor, Michael G.; Ivers, John T.; and Stutz, H. Kent, 4,421,779., Cl. 426-660.000.

Toppan Printing Co., Ltd.: *See*—
Kuzuoka, Shinichi; Tachibana, Yoshinori; Saito, Goro; and Kitajima, Nobuyuki, 4,421,599., Cl. 162-100.000.
Takei, Masayuki, 4,422,101., Cl. 358-299.000.

Toru, Takeshi: *See*—
Okamura, Noriaki; Toru, Takeshi; Oba, Takeo; Tanaka, Toshio; Bannai, Kiyoshi; Watanabe, Kenzo; Kurozumi, Seizi; Naruchi, Tatsuyuki; and Komoriya, Keiji, 4,421,914., Cl. 544-278.000.

Tosco Corporation: *See*—
Hall, Robert N., 4,421,603., Cl. 201-12.000.

Toyo Jozo Kabushiki Kaisha: *See*—
Fujiwara, Tatsuro; Honda, Eiichi; Sakakibara, Hideo; and Hirano, Takao, 4,421,911., Cl. 536-7.100.

Toyo Kogyo Co., Ltd.: *See*—
Gotomyo, Yasuo, 4,421,350., Cl. 292-123.000.

Toyo Rubber Industry Company, Limited, The: *See*—
Matsubara, Hideyuki; Kosugi, Ikutaka; and Tsukamoto, Chiaki, 4,421,821., Cl. 428-323.000.

Toyo Sushinki Kabushiki Kaisha: *See*—
Matsuno, Tatsuji; and Nomura, Yosio, 4,422,034., Cl. 324-51.000.

Toyoda Gosei Co. Ltd.: *See*—
Oyama, Motofumi; and Hashimoto, Kinro, 4,421,884., Cl. 524-209.000.

Toyota Chuo Kenky usho Kabushiki Kaisha: *See*—
Futamura, Yoshisumi; Komeiji, Shigeki; Noro, Shuhei; Hasegawa, Junzo; Matsunari, Fumio; and Ikeda, Toshiaki, 4,421,494., Cl. 464-111.000.

Toyota Jidosha Kabushiki Kaisha: *See*—
Kamiya, Hideo; Shinohara, Hiroshi; Otuka, Yasuhiro; and Okazaki, Mari, 4,421,720., Cl. 422-97.000.
Oyama, Motofumi; and Hashimoto, Kinro, 4,421,884., Cl. 524-209.000.
Shibata, Takuo; Izuta, Mitsugu; and Matano, Tetsuya, 4,421,187., Cl. 180-73.00D.

Toyota Jidosha Kogyo Kabushiki Kaisha: *See*—
Futamura, Yoshisumi; Komeiji, Shigeki; Noro, Shuhei; Hasegawa, Junzo; Matsunari, Fumio; and Ikeda, Toshiaki, 4,421,494., Cl. 464-111.000.
Ito, Keiichi; Yamaguchi, Nobuyuki; Hayashi, Kazuhiko; Asami, Ken; Sato, Kazuo; and Ochiai, Takeshi, 4,421,192., Cl. 180-179.000.
Itoh, Hajime; and Igarashi, Yoshiyuki, 4,422,024., Cl. 318-443.000.
Nagase, Masaomi; and Miyagi, Hideo, 4,421,085., Cl. 123-416.000.
Shirai, Kenji; and Nakagawa, Fumio, 4,421,362., Cl. 303-115.000.
Watanabe, Tomoyuki; and Shigematsu, Takashi, 4,421,086., Cl. 123-425.000.
Yoshitsugu, Noritada; and Ando, Atsuo, 4,421,343., Cl. 280-752.000.

Tracez, Jean: *See*—
Blazy, Pierre; Houot, Robert; Joussemet, Robert; Haicour, Philippe; and Tracez, Jean, 4,421,641., Cl. 209-166.000.

Trager, Seymour F.; and Chylinski, Victoria S. Artificial tear aid. 4,421,748., Cl. 424-199.000.

Trane Company, The: *See*—
Hoff, Herbert L.; and Leaver, Daniel C., 4,421,453., Cl. 415-88.000.

Treakle, Paul W.; and Cielakie, Edward W., to Accutest Corporation. Contact array. 4,421,370., Cl. 339-59.00M.

Tri/Valley Growers: *See*—
Reznik, David, 4,421,781., Cl. 427-46.000.

Tricoles, Gus P.; and Rope, Eugene L., to General Dynamics Corporation, Electronics Division. Passive synthetic aperture system for locating a source of electromagnetic radiation. 4,422,076., Cl. 343-458.000.

Trimmer, Raymond W.; and McCullagh, Morris B., to Polymex Pty. Limited. Cane crushing apparatus. 4,420,863., Cl. 29-121.500.

Trinh, Toan: *See*—
Bish, Steven S.; Sagel, Paul J.; and Trinh, Toan, 4,421,809., Cl. 428-90.000.

Tripp, James W.; and Schoenmaker, John, to Universal Instruments Corporation. Insertion head for dip and dip socket components. 4,420,878., Cl. 29-741.000.

Triumph-Adler A.G. fur Buro- und Informationstechnik: *See*—
Dorrfub, Klaus; and Krausser, Werner, 4,421,431., Cl. 400-124.000.
Gubbe, Bernd; Krause, Klaus-Dieter; Schonemann, Otto; and Neidhardt, Rudolf, 4,421,035., Cl. 108-6.000.

Troue, Harden H., to Union Carbide Corporation. Process for producing textured coatings. 4,421,784., Cl. 427-54.100.

Troup, Alan G.: *See*—
Stuart, Ronald B.; and Troup, Alan G., 4,421,063., Cl. 122-4.00D.

Trowbridge, Charles A., to Sim Kar Lighting Fixture Co., Inc. Fluorescent-type fixture having improved fold-out lamp socket assemblies. 4,422,132., Cl. 362-220.000.

TRW Inc.: *See*—
Asawa, Charles K.; and Yao, Shi-Kay, 4,421,979., Cl. 250-227.000.
Hammerle, Frederick A., 4,420,859., Cl. 24-585.000.

Ts'ao, Si-Ling. System for control of water temperature. 4,421,269., Cl. 236-12.120.

Tsuda, Hiroshi: *See*—
Arima, Sumitsugu; Tsuda, Hiroshi; and Fukunaga, Yukio, 4,421,960., Cl. 200-61.540.
Hashimoto, Shintaro; Morita, Akitaka; and Tsuda, Hiroshi, 4,421,416., Cl. 368-63.000.

Tsuda, Katsuhiro; Tanaka, Hisao; Nagae, Michio; and Imanaga, Yasuhiko, to Dainippon Ink and Chemicals, Inc. Halogen-containing resin composition containing ester plasticizer. 4,421,885., Cl. 524-295.000.

Tsukamoto, Chiaki: *See*—
Matsubara, Hideyuki; Kosugi, Ikutaka; and Tsukamoto, Chiaki, 4,421,821., Cl. 428-323.000.

Tsumura, Kenji; and Yamashita, Masayuki, to Oriental Metal Mfg. Co. Process for distilling water. 4,421,606., Cl. 203-10.000.

Tsumura, Masakatsu: *See*—
Fuji, Tsuneharu; Tsumura, Masakatsu; and Ishikawa, Takayoshi, 4,422,059., Cl. 333-202.000.

Tsunoi, Haruo: *See*—
Sato, Tadashi; Tsunoi, Haruo; and Kishi, Hirotoshi, 4,421,403., Cl. 355-8.000.

Tuchscherer, Michael A.: *See*—
Martinson, William E.; and Tuchscherer, Michael A., 4,421,190., Cl. 180-90.000.

Tuggle, Lloyd H.; and Loyd, Ronald C., to Emerson Electric Co. Portable power operated cultivator with axially adjustable shield. 4,421,176., Cl. 172-41.000.

Tuin, Hermanus N.: *See*—
Feenstra, Johannes; Tuin, Hermanus N.; and Schrederhof, Antonie, 4,421,706., Cl. 264-157.000.

Tuites, Richard C.: *See*—
Ponticello, Ignazio S.; Hollister, Kenneth R.; and Tuites, Richard C., 4,421,915., Cl. 544-387.000.

Turchi, Peter J.; and Vitkovitsky, Ihor M., to United States of America, Navy. MPD Intense beam pulser. 4,422,013., Cl. 315-111.810.

Turner, Kebbie J., Sr.: *See*—
Laky, Tibor; Lane, William C.; and Turner, Kebbie J., Sr., 4,421,286., Cl. 244-116.000.

Turner, Norman L.: *See*—
Robertson, David A.; and Turner, Norman L., 4,421,988., Cl. 250-492.200.

Turovsky, Leonid N.: *See*—
Bildjukevich, Viktor L.; Turovsky, Leonid N.; Meleshko, Vyacheslav J.; Yakimovich, Dmitry T.; Lebedkova, Valentina A.; Demidovich, Boris K.; Plavnik, Gennady Z.; Dubrovsky, Nikolai N.; Proskalovich, Evgeny A.; and Pivovarov, Alexandr I., 4,421,594., Cl. 159-4.00R.

Tuttle, Gary E., to Rockwell International Corporation. Downhole steam generator and turbopump. 4,421,163., Cl. 166-59.000.

Twardowska, Helena, to ERCO Industries Limited. Stabilization of red phosphorus. 4,421,728., Cl. 423-265.000.

Uba, Toshio, to Gates Rubber Company, The. Electrochemical cell. 4,421,832., Cl. 429-72.000.

Ube Industries, Ltd.: *See*—
Nagai, Shigeki; Yorie, Takashi; Sugiura, Hisao; Hibi, Toru; Sato, Katsumi; Wada, Takuo; and Miyahara, Masahiko, 4,421,761., Cl. 424-275.000.
Umemura, Sumio; Fujii, Kozo; Nishihira, Keigo; Sawada, Hiroyuki; Tanaka, Shuji; Nakai, Mamoru; Yoshida, Hiroshi; and Kuroki, Yoshiaki, 4,421,925., Cl. 549-372.000.

Uchiyama, Tsugio: *See*—
Ishikawa, Hiromichi; Kitaori, Kazuhiko; Kaneko, Kimiyoshi; Moriyama, Satoru; Kobayashi, Takashi; and Uchiyama, Tsugio, 4,421,750., Cl. 424-207.000.

Uchuck, Alexander: *See*—
Montilla, Lino M., Jr.; and Uchuck, Alexander, 4,421,374., Cl. 339-97.00P.

Udono, Jun, to Nissan Motor Company, Ltd. Automotive vehicle hydraulic system. 4,420,934., Cl. 60-422.000.

Ueda, Shinjiro: *See*—
Yoshinaga, Yoichi; Kobayashi, Hiromi; Ueda, Shinjiro; Takada, Yoshihiro; and Nishida, Hideo, 4,421,457., Cl. 415-211.000.

Ueda, Toshitsugu; and Kohsaka, Fusao, to Yokogawa Hokushin Electric Corp. Mechanical vibrating element. 4,421,381., Cl. 350-6.600.

Uehara, Kazuo: *See*—
Naruse, Toshihiro; Uehara, Kazuo; and Saito, Hideaki, 4,420,937., Cl. 60-450.000.

Uehara, Takami. Fiber scope for biopsy operable by a single operator. 4,421,106., Cl. 128-4.000.

Uemura, Morito; Kishi, Kenichi; Nakagawa, Satoshi; Kida, Shuji; and Sugita, Hiroshi, to Konishiroku Photo Industry Co., Ltd. Silver halide photographic light-sensitive material. 4,421,845., Cl. 430-544.000.

Uhl, George A.: *See*—
Baillie, Lloyd A.; and Uhl, George A., 4,420,966., Cl. 7[illegible] 28.000.

Uhlenhoff, Arnold, to ITT Industries Inc. Binary MOS switched-carry parallel adder. 4,422,157., Cl. 364-786.000.

Ukai, Jun; Tetsu, Toyozo; and Shamoto, Kunio, to Mitsubishi Denki Kabushiki Kaisha. Arc welding process. 4,421,971., Cl. 219-128.000.

Ullrich, Kurt: *See*—
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Ulm, John G.: *See*—
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Umehara, Teruo: *See*—
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Umemura, Sumio; Fujii, Kozo; Nishihira, Keigo; Sawada, Hiroyuki; Tanaka, Shuji; Nakai, Mamoru; Yoshida, Hiroshi; and Kuroki, Yoshiaki, to Ube Industries, Ltd. 4-Alkoxy-1,3-dioxane-5-carbonitriles and process for preparing the same. 4,421,925., Cl. 549-372.000.

Umezawa, Kazumi: *See*—
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,421,402., Cl. 355-8.000.

Union Carbide Corporation: *See*—
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Troue, Harden H., 4,421,784., Cl. 427-54.100.
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Union Oil Company of California: *See*—
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United Biscuits (UK) Limited: *See*—
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United Kingdom Atomic Energy Authority: *See*—
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United States Gypsum Company: *See*—
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Reily, William S., 4,421,704., Cl. 264-133.000.

United States of America
Agriculture: *See*—
Chan, Harvey T., Jr., 4,421,775., Cl. 426-482.000.
Edwards, Richard H.; and Kohler, George O., 4,421,682., Cl. 260-112.00R.
Air Force: *See*—
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Kontis, George E.; and Evans, Sherwood P., 4,421,008., Cl. 89-33.0CA.
Lienau, Jeffrey A., 4,422,041., Cl. 324-207.000.
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Lord, David E., 4,420,974., Cl. 73-154.000.
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Health and Human Services: *See—*
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National Aeronautics and Space Administration: *See—*
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Kosmahl, Henry G., 4,422,012., Cl. 315-3.500.
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U.S. Philips Corporation: *See—*
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Solo de Zaldivar, Jose, 4,420,872., Cl. 29-571.000.
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United States Steel Corporation: *See—*
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Universal Instruments Corporation: *See—*
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Kulprathipanja, Santi; and deRosset, Armand J., 4,421,567., Cl. 127-46.300.
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Updike, Mark H.; and Calton, Gary J., to W. R. Grace & Co. Fermentative preparation of L-leucine. 4,421,853., Cl. 435-116.000.
Updike, Mark H.; and Calton, Gary J., to W. R. Grace & Co. Fermentative preparation of L-leucine. 4,421,854., Cl. 435-116.000.
Ushikoshi, Kenichi, to Kabushiki Kaisha Suwa Seikosha. Electronic timepiece with animation. 4,421,420., Cl. 368-229.000.
Uskokovic, Milan R.: *See—*
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USM Corporation: *See—*
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V M E I "Lenin": *See—*
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Vadas, Zoltan: *See—*
Bodas, Janos; Papp, Istvan; Palfalvi, Gyorgy; and Vadas, Zoltan, 4,420,950., Cl. 62-402.000.
Vaes, Henricus M. J.; Appels, Johannes A.; and Ludikhuize, Adrianus W., to U.S. Philips Corporation. Semiconductor device having a reduced surface field strength. 4,422,089., Cl. 357-22.000.
Vagias, Ernest. Propulsion system for a vehicle. 4,421,217., Cl. 192-0.09E.
Valeo Societe Anonyme: *See—*
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Valsamis, Lefteris N.: *See—*
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Van, Doan P.: *See—*
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Van Bosse, John G., to Bell Telephone Laboratories, Incorporated. Method and arrangement for signaling the transmission mode of a communication system. 4,421,951., Cl. 179-2.0DP.
Van Broekhoven, Johannes A. M.; and John, Christopher S., to Shell Oil Company. Process for the co-production of ketones and mono-olefins. 4,421,933., Cl. 568-403.000.
Vance, Alvin M.: *See—*
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Vandelli, Dino; Fabriani, Ugo; and Vandelli, Ambrogino, to ASCO Di Vandelli Dino & C. S.N.C. Rotary cultivator hoeing tool fitted with one or more non-compaction teeth. 4,421,178., Cl. 172-548.000.
van der Aa, Herman H. M., to U.S. Philips Corporation. Solar collector. 4,421,099., Cl. 126-433.000.
Vanderlans, Gerald J. Sealing device for use in grouting pipe joints and method of using same. 4,421,698., Cl. 264-40.100.
Van Dyke, James R., to Monsanto Company. Assembly for mounting a vehicle spray suppression device. 4,421,333., Cl. 280-154.50R.
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van Paassen, Nicolaas A. I.; and van Riel, Hermanus C. H., to Chem-Y Fabriek van Cheminche Produkten B.V. Process for preparing a pumpable surface-active product based on polyester acetic acid. 4,421,930., Cl. 562-470.000.
van Riel, Hermanus C. H.: *See—*
van Paassen, Nicolaas A. I.; and van Riel, Hermanus C. H., 4,421,930., Cl. 562-470.000.
Van Veldhuizen, John. Propeller driven vehicle with forward and reverse control air rudders. 4,421,489., Cl. 440-37.000.
Varco International, Inc.: *See—*
Boyadjieff, George I.; and Campbell, Andrew B., 4,421,175., Cl. 166-383.000.
Boyadjieff, George I., 4,421,179., Cl. 173-44.000.
Vargo, William R., to Husky Systems of Georgia, Inc. Key for use with knock-down shelving units. 4,421,239., Cl. 211-187.000.
Varian Associates, Inc.: *See—*
Muka, Richard S.; and Russo, Carl J., 4,421,479., Cl. 432-31.000.
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Varma, Indra K.; Fohlen, George M.; and Parker, John A., to United States of America, National Aeronautics and Space Administration.

Elastomer-modified phosphorus-containing imide resins. 4,421,820., Cl. 428-246.000.
Varnum, Nancy C.: *See—*
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Vaubel, Gert; Rathert, Rolf; and Ritter, Alfred, to Studiengesellschaft Kohle mbH. Process for the optimized heat transfer from carriers of reversible, heterogeneous evaporation processes for the purpose of generating heat or cold and apparatus for carrying out the process. 4,421,156., Cl. 165-1.000.
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VEB Werk fur Fernsehelektronik Berlin im VEB Kombinat Mikroelektronik: *See—*
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Vend-A-Copy, Inc.: *See—*
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Verbrugge, Pieter A., to Shell Oil Company. Process for the preparation of bicyclo [2.2.] heptene derivatives. 4,421,935., Cl. 568-343.000.
Vereinigte Aluminium-Werke Aktiengesellschaft: *See—*
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Vermette, Howard H.; and Daugherty, Andrew H., to Vermette Machine Company, Inc. Lift apparatus. 4,421,209., Cl. 187-9.00R.
Vermette Machine Company, Inc.: *See—*
Vermette, Howard H.; and Daugherty, Andrew H., 4,421,209., Cl. 187-9.00R.
Vicker, Wayne. Beverage preparation assembly. 4,421,014., Cl. 99-289.00P.
Vidal, Frederick D.; and Jayaraman, Anantharaman, to Pennwalt Corporation. Gaseous antimicrobial treatments of storage grain with sulfur dioxide and ammonia. 4,421,774., Cl. 426-319.000.
Vidal, Roland: *See—*
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Videm, Ketil, to Institutt for Energiteknikk. Process for the preparation of a dark-colored, wave-length selective oxide film on aluminum. 4,421,612., Cl. 204-58.000.
Video Education, Inc.: *See—*
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Vigerstol, Ole K., to SAB Nife AB. Method and device for charging an electrical accumulator battery by means of solar-cells. 4,422,031., Cl. 320-2.000.
Villanueva, Gilberto M. Hygienic toothbrush comprising a container for dentifrice substances. 4,421,433., Cl. 401-175.000.
Vitale, George; and Wilkinson, Richard L., to Discovision Associates. Lens assembly for a video recorder-playback machine. 4,422,169., Cl. 369-45.000.
Vitkovitsky, Ihor M.: *See—*
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Vizmuller, Peter, to Motorola, Inc. Folded-over helical resonator. 4,422,058., Cl. 333-202.000.
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Voreck, Wallace E., Jr., to United States of America, Army. Castable high explosive compositions of low sensitivity. 4,421,578., Cl. 149-2.000.
Vosteen, Bernhard: *See—*
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Vought Corporation: *See—*
Billingsley, James D.; and Eden, Dayton D., 4,421,985., Cl. 250-353.000.
Vrana, Charles K. Sound reflector type hearing aid. 4,421,199., Cl. 181-136.000.
Vranish, John M.; and Maggelet, Charles E., to United States of America, Navy. Magnetic ship's hog line holder. 4,421,205., Cl. 182-82.000.
VS Systems, Inc.: *See—*
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W. R. Grace & Co.: *See—*
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Updike, Mark H.; and Calton, Gary J., 4,421,854., Cl. 435-116.000.
Wacker-Chemie GmbH: *See—*
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Wada, Takuo: *See—*
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Waddill, Harold G.; and Sellstrom, Kathy B., to Texaco Inc. Water-based epoxy resin coating composition. 4,421,906., Cl. 528-111.000.
Wade, Wallace R., to Ford Motor Company. Diesel engine combination fuel vaporizer and air/fuel mixer. 4,421,079., Cl. 123-255.000.
Wagner, Robert A.: *See—*
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Wagstaff Engineering, Incorporated: *See—*
Wagstaff, Frank E., 4,421,155., Cl. 164-444.000.
Wagstaff, Frank E., to Wagstaff Engineering, Incorporated. Machine duplicatable, direct chill flat ingot casting mold with controlled corner water and adjustable crown forming capability. 4,421,155., Cl. 164-444.000.
Wahlfahrt, Harald. Decoration stand in the form of a Christmas tree. 4,421,801., Cl. 428-19.000.
Wakao, Masato; and Sugizaki, Iwao, to Mitutoyo Mfg. Co., Ltd. Dial gauge. 4,420,888., Cl. 33-172.00R.
Wakeling, Antony J.; Thompson, Alan D.; and Sumner, Roy W., to Solartron Electronic Group Limited, The. Digital simulation apparatus. 4,421,484., Cl. 434-3.000.
Walker Forge, Inc.: *See—*
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Wallace, Edward M.; Gosselin, Robert G.; and Labarre, Ernest D., to Wallace Mfg. Corp. Pruning apparatus of the compound action hook and blade type. 4,420,883., Cl. 30-251.000.
Wallace Mfg. Corp.: *See—*
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Wallace, Robert L., Jr., to Bell Telephone Laboratories, Incorporated. End-fire microphone and loudspeaker structures. 4,421,957., Cl. 179-121.00D.
Walsh, David J.: *See—*
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Wang, Taylor G.: *See—*
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Warden, Gerald D.: *See—*
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Washington, Derek; and Knapp, Alan G., to U.S. Philips Corporation. Channel plate electron multiplier. 4,422,005., Cl. 313-105.0CM.
Wason, Satish K., to J. M. Huber Corporation. High fluoride compatibility dentifrice abrasives and compositions. 4,421,527., Cl. 51-308.000.
Watanabe, Hiroshi, to Nippon Electric Co., Ltd. Memory device. 4,422,160., Cl. 365-189.000.
Watanabe, Hiroshi: *See—*
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Watanabe, Ichiro; Sakashita, Keiichi; and Ogawa, Yasuo, to Nitto Chemical Industry Co., Ltd. Production of acrylamide using immobilized cells. 4,421,855., Cl. 435-129.000.
Watanabe, Kenzo: *See—*
Okamura, Noriaki; Toru, Takeshi; Oba, Takeo; Tanaka, Toshio; Bannai, Kiyoshi; Watanabe, Kenzo; Kurozumi, Seizi; Naruchi, Tatsuyuki; and Komoriya, Keiji, 4,421,914., Cl. 544-278.000.
Watanabe, Tomoyuki; and Shigematsu, Takashi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Ignition timing control system for an engine. 4,421,086., Cl. 123-425.000.
Watkins, Cecil J.; and Watkins, Simon R., to Tobex Motivated Chair Company Limited. Stair vehicle. 4,421,189., Cl. 180-8.00A.
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Watkins, Cecil J.; and Watkins, Simon R., 4,421,189., Cl. 180-8.00A.
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Watson, James M.; Grootjans, Jacques F. J.; and Delorme, Luc F. L. N., to Cosden Technology, Inc. Methods for separating hydrocarbons by liquid extraction. 4,421,640., Cl. 208-326.000.
Watson, John D., Sr., to Dow Chemical Company, The. Improved ion exchange particle regeneration method. 4,421,864., Cl. 521-26.000.

Watts, Thomas E., to McGraw-Edison Company. Magnetic mounting support for light fixture including shock absorptive arrangement. 4,422,137., Cl. 362-390.000.

Wausau Metals Corporation: *See*—
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Weber, Jean C.: *See*—
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Weber, Joseph H., to Progressive Blasting Systems, Inc. Monitor method and apparatus for particle blasting equipment. 4,420,957., Cl. 72-1.000.

Weber, Ronald J., to Wausau Metals Corporation. Wall opening frame member. 4,420,919., Cl. 52-204.000.

Webster, James A.: *See*—
Ellard, James A.; and Webster, James A., 4,421,913., Cl. 544-260.000.

Webster, Kenneth, to Branson, Jones & Branson. Multi-blade lawnmower attachment. 4,420,925., Cl. 56-15.900.

Wedco Inc.: *See*—
Feder, Friedhelm R., 4,421,703., Cl. 264-68.000.

Wedl, Peter: *See*—
Worschech, Kurt; and Wedl, Peter, 4,421,886., Cl. 524-310.000.

Weibel, Edmund: *See*—
Binnig, Gerd; Nievergelt, Hermann; Rohrer, Heinrich; and Weibel, Edmund, 4,422,002., Cl. 310-328.000.

Weidmann, Erich, to Loepfe Brothers Limited. Inductive projectile sensor on a gripper shuttle weaving machine. 4,421,143., Cl. 139-341.000.

Weigh-Tronix, Inc.: *See*—
Bradley, Richard S., 4,421,186., Cl. 177-139.000.

Weimer, Charles L.: *See*—
Shannon, Bill M.; and Weimer, Charles L., 4,421,367., Cl. 339-14.00R.

Weiner, Antoine: *See*—
Metz, Paul; Legille, Edouard; Schleimer, Francois; and Weiner, Antoine, 4,421,555., Cl. 75-53.000.

Weinert, Friedrich. Cargo torpedo. 4,421,050., Cl. 114-256.000.

Weisel, George L.: *See*—
Bartholmey, Don S.; Babcock, Ronald D.; and Weisel, George L., 4,420,949., Cl. 62-354.000.

Weisert, Edward D.: *See*—
Schulz, David W.; and Weisert, Edward D., 4,420,958., Cl. 72-21.000.

Weiss, Gerhart. Crystal vibrator actuated relay. 4,422,001., Cl. 310-328.000.

Weissman, Walter: *See*—
Grenoble, Dane C.; and Weissman, Walter, 4,421,637., Cl. 208-120.000.

Weisz, William, to Singer Company, The. Needle design and clamping system. 4,421,041., Cl. 112-226.000.

Welles Products Corporation: *See*—
Walker, James D., 4,421,534., Cl. 55-73.000.

Welsh, James K.: *See*—
Barnes, Derek; Churchland, Mark T.; Herndier, Arnold W.; and Welsh, James K., 4,421,149., Cl. 144-366.000.

Wendt, Hans J., to Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung. Control signal transmitting apparatus, particularly for aircraft. 4,422,180., Cl. 455-603.000.

Werkzeugmaschinenfabrik Oerlikon-Burle AG: *See*—
Kocher, Willi; and Zimmermann, Jakob, 4,421,006., Cl. 89-1.00K.

Werth, Dee A.: *See*—
Ratchford, Lloyd G.; and Werth, Dee A., 4,421,373., Cl. 339-94.00M.

Werther, Heinz U.: *See*—
Lehner, August; Werther, Heinz U.; Naegele, Dieter; Lenz, Werner; Jun, Mong-Jon; Reimann, Horst; and Eckell, Albrecht, 4,421,840., Cl. 430-273.000.

Weskamp, Wilhelm; Nashan, Gerd; and Stewen, Wilhelm, to Ruhrkohle Aktiengesellschaft. Procedure to control quality of coal. 4,421,604., Cl. 201-1.000.

Westall, Stephen: *See*—
Burril, Peter M.; and Westall, Stephen, 4,421,796., Cl. 427-387.000.

Western Electric Co.: *See*—
Mahajan, Roop L.; and Ristorcelli, Joseph R., Jr., 4,421,786., Cl. 427-82.000.

Western Electric Company, Inc.: *See*—
Bock, Anne B., 4,421,266., Cl. 228-180.00A.
Boyer, Albert E.; Callahan, John T.; and Filocamo, Peter P., 4,421,265., Cl. 228-180.00R.
Harringer, Robert V., 4,420,879., Cl. 29-764.000.
Mielke, Robert W., 4,420,880., Cl. 29-764.000.
Montilla, Lino M., Jr.; and Uchuck, Alexander, 4,421,374., Cl. 339-97.00P.
Piazza, John R., 4,421,814., Cl. 428-195.000.
Saban, John F., 4,421,368., Cl. 339-17.0CF.

Westinghouse Electric Corp.: *See*—
Alvino, William M., 4,421,877., Cl. 523-414.000.
Godwin, Gurney L.; and Vance, Alvin M., 4,422,028., Cl. 318-718.000.
Gunter, John B.; Quinn, George J.; Shields, Edward P.; Thomas, Burton S.; and Winkler, Clifford J., 4,421,715., Cl. 376-245.000.
Shannon, Bill M.; and Weimer, Charles L., 4,421,367., Cl. 339-14.00R.

Westvaco Corporation: *See*—
DeLigt, John, 4,421,591., Cl. 156-508.000.

Westwood, William D.: *See*—
Shepherd, Frank R.; and Westwood, William D., 4,422,090., Cl. 357-23.000.

Whirlpool Corporation: *See*—
Brenner, Robert A.; Clearman, Jack F.; and Platt, Clark L., 4,420,952., Cl. 68-53.000.
Clearman, Jack F.; Hageman, James R.; and Platt, Clark L., 4,420,951., Cl. 68-17.00R.

Whisler, John W.; and Re Mine, Walter J. Method and apparatus for obtaining a non-cephalic referential electroencephalogram. 4,421,121., Cl. 128-731.000.

Whitaker, Terrell R.: *See*—
Nusbaumer, Kay T.; and Whitaker, Terrell R., 4,421,137., Cl. 138-89.000.

Whitehouse, John A., to AEW Engineering Co. Limited. Apparatus for portioning meat. 4,420,997., Cl. 83-105.000.

Whitey Co.: *See*—
Koch, Ulrich H.; and Babuder, Gerald A., 4,421,293., Cl. 251-61.400.

Whitlock, Gerald D. Method of detecting the presence of live organisms in substances. 4,421,848., Cl. 435-8.000.

Whitlock, Jacob O., to Structural Rubber Products Company. Splicing and grade crossing construction. 4,421,272., Cl. 238-8.000.

Wich, Harald, to Diehl GmbH & Co. Supply circuit for a load which is to be continually supplied within a projectile. 4,421,029., Cl. 102-207.000.

Wienecke, Horst G. P.: *See*—
Stock, Karl-Wilhelm; Brudney, Norman; and Wienecke, Horst G. P., 4,421,771., Cl. 426-94.000.

Wiener, Stanley M. Mechanized tooth brush having movement in two planes. 4,420,851., Cl. 15-22.00R.

Wiker, Jan M.; and Cunningham, Franklin E., to Kansas State University Research Foundation. Method of preparing high protein snack food from egg protein. 4,421,770., Cl. 426-89.000.

Wilcox, Brian N.; and Robinson, John W., to Kimball International, Inc. Full note generator system for an electronic organ. 4,421,001., Cl. 84-1.170.

Wilhelm, Karl H.: *See*—
Schaper, Hartwig; and Wilhelm, Karl H., 4,422,006., Cl. 313-483.000.

Wilkinson, Calvin L.; and Shaw, Christopher G., to Boeing Company, The. Thermal control method. 4,421,105., Cl. 126-452.000.

Wilkinson, Richard L.: *See*—
Vitale, George; and Wilkinson, Richard L., 4,422,169., Cl. 369-45.000.

Wilkinson, Wilfred H.; Pateman, Edwin; Gale, Anthony G.; and Slinger, John, to Rolls-Royce Limited. Method of making an aerofoil member for a gas turbine engine. 4,421,153., Cl. 164-35.000.

Willamette Industries, Inc.: *See*—
Croley, Thomas E., 4,421,253., Cl. 222-105.000.

Willem, Michel, to Societe Anonyme dite: Ceraver. Line post type electric insulator. 4,421,948., Cl. 174-158.00R.

Williams, Barry E.; Evans, Norol T.; and Propster, John A., to Hughes Aircraft Company. Signal skimming system. 4,422,074., Cl. 343-5.0CF.

Williams, David E., to Summit Systems, Inc. Method and apparatus for randomly positioning indica-bearing members. 4,421,310., Cl. 273-143.00R.

Williams, Joe L.: *See*—
Windt, Norman F.; and Williams, Joe L., 4,421,556., Cl. 75-63.000.

Williams, Raymond D.: *See*—
Smith, Harry M.; and Williams, Raymond D., 4,421,936., Cl. 568-678.000.

Williams, W. Wayne, to United States of America, Air Force. Spherical segment edge attachment. 4,420,914., Cl. 52-80.000.

Williamson, Audley B.; Banks, Stewart; and Rice, Francis J., to Appor Limited. Apparatus for dispensing fluids. 4,421,249., Cl. 222-88.000.

Wilson, Arthur G.: *See*—
Logie, James A.; and Wilson, Arthur G., 4,422,098., Cl. 358-256.000.

Wilson Greatbatch Ltd.: *See*—
Zayatz, Robert A., 4,421,833., Cl. 429-101.000.

Wilson, Pryce. Structural section for containing a vacuum. 4,420,922., Cl. 52-791.000.

Wilson, William W.; and Christe, Karl O., to United States of America, Navy. $NF_4^+WF_7^-$ and $NH_4^+UF_7^-$ and methods of preparation. 4,421,727., Cl. 423-253.000.

Windawi, Hassan, to UOP Inc. Preparation of aldehydes. 4,421,938., Cl. 568-474.000.

Windish, Willis E., to Caterpillar Tractor Co. Planetary transmission. 4,420,992., Cl. 74-781.00R.

Windows, Inc.: *See*—
Swan, Charles A., 4,420,907., Cl. 49-446.000.

Windt, Norman F.; and Williams, Joe L. Method for decontamination of nickel-fluoride-coated nickel containing actinide-metal fluorides. 4,421,556., Cl. 75-63.000.

Wingard, Steve G. Shaped articles for rapid hair drying utilizing polymer blends. 4,421,129., Cl. 132-163.000.

Winkhaus, Gunter: *See*—
Greber, Jorg F.; and Winkhaus, Gunter, 4,421,876., Cl. 523-402.000.

Winkler, Adolf: *See*—
Kruger, Bruno; Winkler, Adolf; and Hentze, Gunter, 4,421,694., Cl. 260-465.00E.

Winkler, Clifford J.: *See*—
Gunter, John B.; Quinn, George J.; Shields, Edward P.; Thomas, Burton S.; and Winkler, Clifford J., 4,421,715., Cl. 376-245.000.

Winkowski, Daniel A., to National Gypsum Company. Wood plank wallcovering system. 4,421,808., Cl. 428-55.000.

Winner, Joe K., to Bendix Corporation, The. Combustible gas detection system. 4,422,073., Cl. 340-870.210.

Winsor, Niels K.: *See*—
Manheimer, Wallace M.; and Winsor, Niels K., 4,421,713., Cl. 376-127.000.

Winstead, Thomas W., to Maryland Cup Corporation. Continuously rotary thermo-forming systems and apparatus of the pressure assist, plug assist and match mold type. 4,421,712., Cl. 264-551.000.

Wischoff, Donald F., to Container Corporation of America. Self-locking container. 4,421,267., Cl. 229-44.00R.

Withjack, Eric M., to Cities Service Company. Collapsible mobile solar energy power source. 4,421,943., Cl. 136-246.000.

Wittek Golf Range Supply Co.: *See*—
Connolly, John F., 4,421,240., Cl. 211-60.00G.

Witten, Raymond L.: *See*—
Beavers, John A.; and Witten, Raymond L., 4,421,999., Cl. 310-87.000.

Wittman, Leroy L.; and Jensen, Lyle B., to FMC Corporation. Removable live mast and hoist unit. 4,421,241., Cl. 212-186.000.

Wolcott, Herbert B., Jr.: *See*—
Dearth, James D.; and Wolcott, Herbert B., Jr., 4,421,169., Cl. 166-285.000.

Wolf, Abe: *See*—
Grumet, Alex; Wolf, Abe; and Calderone, Gaspar J., 4,421,379., Cl. 350-3.720.

Wolf, Anthony D.: *See*—
Selby, Thomas P.; and Wolf, Anthony D., 4,421,550., Cl. 71-92.000.

Wolfe, Larry L., to International Business Machines Corporation. Optical communication on variable power beam. 4,422,099., Cl. 358-293.000.

Wolff, Robert E.: *See*—
Moeller, Gary D.; and Wolff, Robert E., 4,422,111., Cl. 360-72.100.

Wolga, George J.: *See*—
Smithline, Leonard M.; and Wolga, George J., 4,422,154., Cl. 364-571.000.

Woo, Edmund P., to Dow Chemical Company, The. Tetracarboxylic acids. 4,421,929., Cl. 562-465.000.

Woodcock, Stewart J., to Chrysler Corporation. Shift inhibitor assembly. 4,420,993., Cl. 74-785.000.

Woods, Donald C., to Del Mar Avionics. Validator for electrocardial data processing system. 4,422,081., Cl. 346-33.0ME.

Woods, Milton E.: *See*—
Hunsucker, Jerry H.; and Woods, Milton E., 4,421,880., Cl. 524-14.000.

Woodward, John R.: *See*—
Cox, Roger B.; Steer, David C.; and Woodward, John R., 4,421,668., Cl. 252-174.120.

Woratyla, John A.: *See*—
Ritchie, Leon T.; Snyder, Clair W., Jr.; Toeppen, Thurston H.; and Woratyla, John A., 4,420,882., Cl. 29-837.000.

Worschech, Kurt; and Wedl, Peter, to Neynaber Chemie GmbH. Stabilizer-lubricant combination of lead compounds and partial esters of pentaerythritol and/or trimethylolpropane with fatty acids for molding compositions based on polyvinyl chloride. 4,421,886., Cl. 524-310.000.

Wortley, David L.; and Larson, Kenneth N., to Allied Corporation, Law Department. Method and system for data communication. 4,422,171., Cl. 371-32.000.

Wosika, Leon R., to Solar Turbines Incorporated. Turbines. 4,421,454., Cl. 415-117.000.

Wouters, Petrus F. J. A.: *See*—
Denneman, Jan W.; van Dam, Hendrik B. B.; and Wouters, Petrus F. J. A., 4,422,017., Cl. 315-248.000.

Woythal, Robert T.; and Finet, Philip J., to Kearney & Trecker Corporation. High speed machine tool spindle assembly. 4,421,443., Cl. 409-232.000.

Wright, Alan R.: *See*—
Goodridge, Francis; Montgomery, Anthony J.; and Wright, Alan R., 4,421,613., Cl. 204-74.000.

Wright State University: *See*—
Petrofsky, Jerrold S.; and Glaser, Roger M., 4,421,336., Cl. 280-252.000.

Wright, William A., to E-Systems, Inc. Solid state autotune power amplifier. 4,422,047., Cl. 330-51.000.

Wright, William E., Sr.: *See*—
Duncan, John R.; Rohrberg, Roderick G.; Moyer, Ross A.; and Wright, William E., Sr., 4,421,972., Cl. 219-137.0PS.

Wully S.A.: *See*—
Meschi, Luciano, 4,421,590., Cl. 156-506.000.

Wurfel, Helmut. Process for hydrogenation of coal. 4,421,632., Cl. 208-10.000.

Wycklendt, Daniel A.: *See*—
Chen, C. Gregory; and Wycklendt, Daniel A., 4,421,959., Cl. 200-16.00A.

Wylie, Charles F.: *See*—
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Xerox Corporation: *See*—
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Sprague, Robert A., 4,421,387., Cl. 350-356.000.

Yakimovich, Dmitry T.: *See*—
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Yamada, Hideyuki: *See*—
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Yamada, Jun; and Hazama, Katashi, to Hitachi, Ltd. Unidirectional surface acoustic wave device with meandering electrode. 4,422,000., Cl. 310-313.00D.

Yamada, Koichi; Harato, Takuo; Shinya, Yasuo; and Kato, Hisakatsu, to Sumitomo Aluminium Smelting Company, Limited; and Sumitomo Chemical Company, Ltd. Process for producing metallic gallium. 4,421,615., Cl. 204-105.00R.

Yamada, Masamichi: *See*—
Sampei, Tohru; Fujita, Naoya; Higuchi, Shigemitsu; Yamada, Masamichi; and Tomatsuri, Kouichi, 4,422,108., Cl. 360-65.000.
Sampei, Tohru; Fujita, Naoya; Higuchi, Shigemitsu; Yamada, Masamichi; and Tomatsuri, Kohichi, 4,422,109., Cl. 360-65.000.

Yamagami, Kunio: *See*—
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Yamagiwa, Satoshi; Taguchi, Yoshio; and Kayano, Masanori, to Eisai Co., Ltd. Sugar-coated tablet containing fat-soluble pharmaceutical material. 4,421,738., Cl. 424-35.000.

Yamaguchi, Kenzo; Take, Yoshinari; and Manabe, Akiyoshi, to Chlorine Engineers Corp. Ltd. Method of bypassing electric current of electrolytic cells. 4,421,614., Cl. 204-98.000.

Yamaguchi, Nobuyuki: *See*—
Ito, Keiichi; Yamaguchi, Nobuyuki; Hayashi, Kazuhiko; Asami, Ken; Sato, Kazuo; and Ochiai, Takeshi, 4,421,192., Cl. 180-179.000.

Yamaguchi, Ryoji, to Tokyo Shibaura Denki Kabushiki Kaisha. Polygon mirror for use with laser beam scanning apparatus including means for handling and storing the mirror. 4,421,385., Cl. 350-299.000.

Yamaguchi, Shoichiro; and Kobayashi, Fujio, to Tokyo Institute of Technology, The President of. Reconstruction method of a computed tomographic image from a few X-ray projections. 4,422,146., Cl. 364-414.000.

Yamaha Motor Co., Ltd.: *See*—
Nakahama, Ryoji, 4,421,490., Cl. 440-89.000.

Yamamori, Kenji: *See*—
Oota, Hiroyuki; Aoshima, Terutaka; Yamamori, Kenji; and Narita, Ryuho, 4,421,974., Cl. 219-441.000.

Yamamoto, Hideo: *See*—
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Yamamoto, Masahiko: *See*—
Kimoto, Yasuo; Yamamoto, Masahiko; Tamiya, Katsunori; Sakai, Yoshihito; Komura, Akio; Honda, Shoichi; Machata, Hidehiko; Kamada, Hiroshi; Suzaki, Tomohiko; and Inoue, Tomoya, 4,421,624., Cl. 204-209.000.

Yamamoto, Sakuei; Inao, Hiroshi; Tokumitsu, Kiyonori; Nishida, Mitsuhiro; and Kumamoto, Sadahiro, to Mitsubishi Denki Kabushiki Kaisha. Shaft seal device for submersible motor. 4,421,324., Cl. 277-24.000.

Yamamoto, Takaaki; and Ohya, Yoshihiro, to Nippon Steel Corporation. Laminated core of transformer. 4,422,061., Cl. 336-218.000.

Yamamoto, Tomoyuki: *See*—
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Yamaoka, Masayoshi: *See*—
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Yamasaki, Jiro: *See*—
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Yamashita, Masayuki: *See*—
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Yamazaki, Noboru; Okuyama, Michio; and Tomita, Seisuke, to Bridgestone Tire Company Limited. Pneumatic tires having improved durability. 4,421,899., Cl. 525-189.000.

Yanagisawa, Hifumi: *See*—
Sakuma, Shinzo; Yanagisawa, Hifumi; Tokuhata, Kazuo; and Miyagawa, Hiroshi, 4,421,961., Cl. 200-144.00B.

Yancey, Charles B.: *See*—
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Yao, Shi-Kay: *See*—
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Yarygin, Vladimir A.: *See*—
Abishev, Dzhantore N.; Malyshev, Vitaly P.; Bauer, Ivan K.; Yarygin, Vladimir A.; Maisakov, Mikhail E.; Gainutdinov, Garifulla K.; Nazarov, Alexandr M.; Kussinov, Temirkhan A.; Burovoi, Isaak A.; and Omarov, Bulat N., 4,422,174., Cl. 373-115.000.

Yarza, Javier: *See*—
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Yazaki, Yoichi: *See*—
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Yeda Research and Development Co., Ltd.: *See*—
Manassen, Joost; Hodes, Gary; and Cahen, David, 4,421,835., Cl. 429-111.000.

Yhtyneet Paperitehtaat oy Jylhavaara: *See*—
Huusari, Erkki, 4,421,595., Cl. 162-23.000.

Ying Mfg. Corp.: *See*—
Yu, Ying-Nien, 4,421,100., Cl. 126-435.000.

Yiltalo, Howard M. Toothpaste dispensing device. 4,421,252., Cl. 222-102.000.

Yoder, Paul R., Jr.: *See*—
Mumola, Peter B.; Yoder, Paul R., Jr.; Casas, Raul E.; and Grossman, William M., 4,422,046., Cl. 330-4.300.

Yokogawa Hokushin Electric Corp.: *See*—
Ueda, Toshitsugu; and Kobsaka, Fusao, 4,421,381., Cl. 350-6.600.

Yokoi, Nobufumi: *See*—
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Yokota, Atsuo: *See*—
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Yonemori, Takaji: *See*—
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Yorie, Takashi: *See*—
Nagai, Shigeki; Yorie, Takashi; Sugiura, Hisao; Hibi, Toru; Sato, Katsumi; Wada, Takuo; and Miyahara, Masahiko, 4,421,761., Cl. 424-275.000.

York, Earl D.; Rustam, Kamil F.; and Hall, Robert D., to Standard Oil Company (Indiana). Delayed coking and dedusting process. 4,421,629., Cl. 208-8.00R.

Yorkanis, Bernard J.; and Sepp, Walter E., to RCA Corporation. Delay circuit employing active bandpass filter. 4,422,052., Cl. 330-295.000.

Yoshida, Hiroshi: *See*—
Umemura, Sumio; Fujii, Kozo; Nishihira, Keigo; Sawada, Hiroyuki; Tanaka, Shuji; Nakai, Mamoru; Yoshida, Hiroshi; and Kuroki, Yoshiaki, 4,421,925., Cl. 549-372.000.

Yoshida Industry Co., Ltd.: *See*—
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Yoshida, Kazuaki: *See*—
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Yoshinaga, Toru: *See*—
Kawai, Hisasi; Sada, Hiroshi; Igashira, Toshihiko; and Yoshinaga, Toru, 4,421,091., Cl. 123-620.000.

Yoshinaga, Yoichi; Kobayashi, Hiromi; Ueda, Shinjiro; Takada, Yoshihiro; and Nishida, Hideo, to Hitachi, Ltd. Diffuser of centrifugal fluid machine. 4,421,457., Cl. 415-211.000.

Yoshino, Akihide: *See*—
Shinkawa, Tsutomu; Yoshino, Akihide; Konishi, Hitoshi; Komuro, Yoshiaki; Hamada, Satoshi; and Okumura, Saburo, 4,421,152., Cl. 164-258.000.

Yoshino, Hozo, to System Homes Company, Ltd.; and Mitsubishi Denki Kabushiki Kaisha. Heat pump air conditioning system. 4,420,947., Cl. 62-160.000.

Yoshioka, Naoki: *See*—
Nakahara, Motohiro; Miyajiri, Tetsuo; Yoshioka, Naoki; and Kuwahara, Toru, 4,421,540., Cl. 65-3.120.

Yoshitsugu, Noritada; and Ando, Atsuo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Knee panel for front seat and knee panel mounting structure for vehicle. 4,421,343., Cl. 280-752.000.

Yoshizawa, Junji: *See*—
Hidaka, Hiroyoshi; Matsumoto, Ikuo; Yoshizawa, Junji; and Kotani, Shigenori, 4,421,754., Cl. 424-250.000.

Yu, Ying-Nien, to Ying Mfg. Corp. Thermosyphon heat pipe hot water appliance. 4,421,100., Cl. 126-435.000.

Zaccaria, Carmine M.: *See*—
Benkendorf, Sol; Calamito, Frank A.; and Zaccaria, Carmine M., 4,421,881., Cl. 524-24.000.

Zagnoli, David A.: *See*—
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Dalton, Augustine L., Jr.; Sheridan, John J., III; and Zagnoli, David A., 4,421,531., Cl. 55-26.000.

Zahnradfabrik Friedrichshafen, AG.: *See*—
Elser, Dieter, 4,421,010., Cl. 91-375.00R.
Meyerle, Michael, 4,420,991., Cl. 74-682.000.

Zahnradfabrik Friedrichshafen, A.G.: *See*—
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Zaidan Hojin Minsei Kagaku Kyokai: *See*—
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Zaschke, Horst: *See*—
Deutscher, Hans-Joachim; Richter, Sabine; Zaschke, Horst; Demus, Dietrich; and Boettger, Ute, 4,421,670., Cl. 252-299.620.

Zauner, Otto, to Owens-Illinois, Inc. Article receiving and decelerating device. 4,421,226., Cl. 198-534.000.

Zayatz, Robert A., to Wilson Greatbatch Ltd. Lithium-halogen cell. 4,421,833., Cl. 429-101.000.

Zehner, Burch E.: *See*—
Suh, Kyung W.; Krueger, David C.; and Zehner, Burch E., 4,421,866., Cl. 521-79.000.

Zemke, Edward H.: *See*—
Guenther, Kenneth L.; Zemke, Edward H.; and Warden, Gerald D., 4,421,587., Cl. 156-256.000.

Zemke, Wayne P.; Maki, Clyde M.; and Smith, Brian J., to Koehring Company. Method and apparatus for applying a thin liquid film to a vibratory plate. 4,421,435., Cl. 404-113.000.

Zena Equipment, Inc.: *See*—
Gudgel, Howard S.; and Guier, William E., 4,421,447., Cl. 414-22.000.

Zenith Radio Corporation: *See*—
Garbacz, Michael, 4,422,057., Cl. 333-194.000.
Lehnert, Stanley E.; and Ankeny, Donald, 4,422,020., Cl. 315-371.000.

Zhemerenko, Anatoly T.: *See*—
Mischenko, Anatoly I.; Talda, Gennady B.; Belogub, Alexandr V.; Podgorny, Anatoly N.; Makarov, Alexandr A.; Zhemerenko, Anatoly T.; Domrachev, Anatoly I.; and Efremov, Petr K., 4,421,072., Cl. 123-1.00A.

Zielinski, Lech S., to Northern Telecom Limited. Telephone tactile alert system. 4,421,953., Cl. 179-2.0EC.

Zimmermann, Jakob: *See*—
Kocher, Willi; and Zimmermann, Jakob 4,421,006., Cl. 89-1.00K.

Zink, Rudolf: *See*—
Loew, Peter; and Zink, Rudolf, 4,421,519., Cl. 8-644.000.

Ziolko, Francis J., to Devro, Inc. Apparatus for processing stuffed sausage casing. 4,420,856., Cl. 17-34.000.

Zulliger, Hans R., to Mettler Instrumente A.G. String-type measurement cell. 4,420,984., Cl. 73-862.590.

Zum Bahlen, Ralph E.: *See*—
Michals, Richard A.; Mozer, Frank H.; and Zum Bahlen, Ralph E., 4,421,427., Cl. 400-94.000.

Zupancic, Ronald L., to Union Carbide Corporation. Liquid cathode cells with a glass fiber separator. 4,421,834., Cl. 429-105.000.

Zurlinden, Donald B.; and Heltmach, Reginald C., Jr., to General Motors Corporation. Push-on terminal clip and assembly. 4,422,128., Cl. 361-408.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 20TH DAY OF DECEMBER, 1983

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Arsenault, Denis J.: *See*—
Robichaud, Vincent P., Re. 31,465., Cl. 135-102.000.

B. F. Goodrich Company, The: *See*—
Hsu, Chin C., Re. 31,468., Cl. 560-209.000.
Riew, Changkiu K., Re. 31,469., Cl. 560-209.000.

Bedard, Brian E.; and Boman, Bertho K., to Motorola, Inc. Stripline filter device. Re. 31,470., Cl. 333-204.000.

Boman, Bertho K.: *See*—
Bedard, Brian E.; and Boman, Bertho K., Re. 31,470., Cl. 333-204.000.

Garcelon, Jean P., to Stein Surface. Process for the adjustment of the glass temperature in a float glass lehr and float glass lehr in order to bring this process into operation. Re. 31,466., Cl. 65-99.300.

Hsu, Chin C., to B. F. Goodrich Company, The. Liquid reactive polymers. Re. 31,468., Cl. 560-209.000.

Imperial Chemical Industries PLC: *See*—
Jones, Geraint; and Thomson, David S., Re. 31,467., Cl. 260-395.000.

Jones, Geraint; and Thomson, David S., to Imperial Chemical Industries PLC. Triaryl or diarylpyridyl methanes. Re. 31,467., Cl. 260-395.000.

Martenas, Wayne B.; Priepke, Edward H.; and Wagstaff, Robert A., to Sperry Corporation. Damped apparatus for quick-stopping rotating members. Re. 31,464., Cl. 56-10.300.

Motorola, Inc.: *See*—
Bedard, Brian E.; and Boman, Bertho K., Re. 31,470., Cl. 333-204.000.

Priepke, Edward H.: *See*—
Martenas, Wayne B.; Priepke, Edward H.; and Wagstaff, Robert A., Re. 31,464., Cl. 56-10.300.

Riew, Changkiu K., to B. F. Goodrich Company, The. Reactive liquid polymers. Re. 31,469., Cl. 560-209.000.

Robichaud, Edward R.: *See*—
Robichaud, Vincent P., Re. 31,465., Cl. 135-102.000.

Robichaud, Eric A.: *See*—
Robichaud, Vincent P., Re. 31,465., Cl. 135-102.000.

Robichaud, Vincent P., to Robichaud, Eric A.; Robichaud, Edward R.; and Arsenault, Denis J. Compactible shelter. Re. 31,465., Cl. 135-102.000.

Sperry Corporation: *See*—
Martenas, Wayne B.; Priepke, Edward H.; and Wagstaff, Robert A., Re. 31,464., Cl. 56-10.300.

Stein Surface: *See*—
Garcelon, Jean P., Re. 31,466., Cl. 65-99.300.

Thomson, David S.: *See*—
Jones, Geraint; and Thomson, David S., Re. 31,467., Cl. 260-395.000.

Wagstaff, Robert A.: *See*—
Martenas, Wayne B.; Priepke, Edward H.; and Wagstaff, Robert A., Re. 31,464., Cl. 56-10.300.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Anderson, Donald R.; and Frisque, Alvin J., to Nalco Chemical Co. Process for rapidly dissolving water-soluble polymers. B1 1,028,474., 12-20-83, Cl. 523-336.000.

Aoshiro, Hisatake, to Machida Endoscope Co., Ltd. Endoscope with closed pressurized inner cavity. B1 4,216,767., 12-20-83, Cl. 128-6.000.

Frisque, Alvin J.: *See*—
Anderson, Donald R.; and Frisque, Alvin J., B1 1,028,474., Cl. 523-336.000.

Machida Endoscope Co., Ltd.: *See*—
Aoshiro, Hisatake, B1 4,216,767., Cl. 128-6.000.

Nalco Chemical Co.: *See*—
Anderson, Donald R.; and Frisque, Alvin J., B1 1,028,474., Cl. 523-336.000.

LIST OF DESIGN PATENTEES

Adenau, Marvin L., to Advertising Metal Display Company. Windshield wiper products cabinet. 271,830., 12-20-83, Cl. D6-127.000.

Advertising Metal Display Company: *See*—
Adenau, Marvin L., 271,830., Cl. D6-127.000.

Agou, Nobuhiro; and Matsuda, Mutsuhide, to Canon Kabushiki Kaisha. Camera. 271,880., 12-20-83, Cl. D16-1.000.

Albertson, Robert V. Sediment indicator. 271,860., 12-20-83, Cl. D10-96.000.

Allen, Albert H.: *See*—
Golden, Neil S., 271,905., Cl. D25-74.000.

Allen, Donald K., to Anderson, Mark. Belt attached container holder. 271,820., 12-20-83, Cl. D2-400.000.

Amway Corporation: *See*—
Powers, Robert M., 271,839., Cl. D7-327.000.
Powers, Robert M., 271,840., Cl. D7-360.000.

Anchor Hocking Corporation: *See*—
Thrush, James L., 271,855., Cl. D9-370.000.

Anderson, Mark: *See*—
Allen, Donald K., 271,820., Cl. D2-400.000.

Arrow Trading Co., Inc.: *See*—
Shimizu, Yoshiharu, 271,871., Cl. D14-53.000.

Astwood, A. Carl, Sr. Dart baseball game board. 271,890., 12-20-83, Cl. D21-6.000.

Atari, Inc.: *See*—
Renteria, William J., 271,891., Cl. D21-13.000.

Berry, Christopher, to Metal Box Limited. Can body. 271,854., 12-20-83, Cl. D9-351.000.

Blaszkowski, Henry. Combined soap bar and holder. 271,910., 12-20-83, Cl. D28-8.100.

Border, Robert N. Combined pill grater and drinking straw. 271,836., 12-20-83, Cl. D7-42.000.

Boudreau, Robert J.: *See*—
Voytko, Charles L.; and Boudreau, Robert J., 271,868., Cl. D12-129.000.

Boyd, Dorothy. Medical service emblem. 271,862., 12-20-83, Cl. D11-105.000.

Brown Group Recreational Products, Inc.: *See*—
Voytko, Charles L.; and Boudreau, Robert J., 271,868., Cl. D12-129.000.

Browning, Albert E. Tractor. 271,876., 12-20-83, Cl. D15-23.000.

Callahan, Paul V. Cup lid. 271,857., 12-20-83, Cl. D9-438.000.

Campton, Charles H. Embalming trocar sterilizer. 271,902., 12-20-83, Cl. D24-09.000.

Canon Kabushiki Kaisha: *See*—
Agou, Nobuhiro; and Matsuda, Mutsuhide, 271,880., Cl. D16-1.000.

Chasen, Lee R.: *See*—
Einhorn, Ruediger; and Chasen, Lee R., 271,850., Cl. D8-395.000.
Clancy, Bruce N. Camera case. 271,822., 12-20-83, Cl. D3-33.000.
Coats & Clark, Inc.: *See*—
Einhorn, Ruediger; and Chasen, Lee R., 271,850., Cl. D8-395.000.
Connecticut Cycle Accessories, Inc.: *See*—
Turkington, Mark; and Turkington, Philip, 271,866., Cl. D12-119.000.
Corba, Robert E.: *See*—
Suhajda, John I.; Corba, Robert E.; Davenport, Richard L.; and Miller, Allen D., 271,856., Cl. D9-375.000.
Danielson, Bernard. Motorcycle backrest. 271,867., 12-20-83, Cl. D12-119.000.
Davenport, Richard L.: *See*—
Suhajda, John I.; Corba, Robert E.; Davenport, Richard L.; and Miller, Allen D., 271,856., Cl. D9-375.000.
Decra Stone, Inc.: *See*—
Knutson, Lawrence M., 271,835., Cl. D7-29.000.
De Mejo, Angelo, to G.D.S. International S.r.l. Eyeglasses. 271,884., 12-20-83, Cl. D16-116.000.
Dolas, Michael. Bookmark. 271,888., 12-20-83, Cl. D19-34.000.
Doyle, Richard C.; Rivera, Lester; and Rosenbaum, Saul, to Leviton Manufacturing Co., Inc. Electronic receptacle housing. 271,869., 12-20-83, Cl. D13-30.000.
DuBois, R. Clark; and Hamma, John C., to Gradco/Dendoki, Inc. Universal sorter. 271,882., 12-20-83, Cl. D16-32.000.
Duracell Inc.: *See*—
Mallory, Henry R., 271,909., Cl. D26-42.000.
Efstratis, Ernest. Ventilation deflector unit. 271,900., 12-20-83, Cl. D23-138.000.
Einhorn, Ruediger; and Chasen, Lee R., to Coats & Clark, Inc. Magnetic clip. 271,850., 12-20-83, Cl. D8-395.000.
Endt, Evert, to Thomson-CSF. Computer display terminal. 271,874., 12-20-83, Cl. D14-113.000.
Engel, Steven M. Game board. 271,892., 12-20-83, Cl. D21-25.000.
Esselte Pendalfex Corporation: *See*—
Reinke, Wolfgang, 271,886., Cl. D18-19.000.
Essilor International (Compagnie Generale d'Optique): *See*—
Waslander, Donald, 271,901., Cl. D24-1.100.
Farhi, Moshe. Connector for molds used in the manufacture of concrete ceilings. 271,878., 12-20-83, Cl. D15-138.000.
Ferdinand, Irwin J.; Sylvan, Richard; and Peterson, Michael, to Hirsh Company. Knob. 271,843., 12-20-83, Cl. D8-312.000.
Florists' Transworld Delivery Association: *See*—
Kowalik, Marie P., 271,863., Cl. D11-152.000.
G.D.S. International S.r.l.: *See*—
De Mejo, Angelo, 271,884., Cl. D16-116.000.
Gear, Inc.: *See*—
Waites, Raymond, 271,823., Cl. D3-71.000.
General Motors Corporation: *See*—
Gierschick, Walter K.; and Kesling, Keith, 271,873., Cl. D14-76.000.
Gierschick, Walter K.; and Kesling, Keith, to General Motors Corporation. Radio control unit. 271,873., 12-20-83, Cl. D14-76.000.
Giugiaro, Giorgetto, to Nippon Kogaku K.K. Binoculars. 271,885., 12-20-83, Cl. D16-133.000.
Golden, Neil S., to Allen, Albert H. Expansion joint sealing strip. 271,905., 12-20-83, Cl. D25-74.000.
Gradco/Dendoki, Inc.: *See*—
DuBois, R. Clark; and Hamma, John C., 271,882., Cl. D16-32.000.
GTE Automatic Electric Labs Inc.: *See*—
Janda, George M., 271,872., Cl. D14-61.000.
Hamma, John C.: *See*—
DuBois, R. Clark; and Hamma, John C., 271,882., Cl. D16-32.000.
Hansen, Erik L., to Rosti Plastic A/S. Handle for kitchen utensils. 271,841., 12-20-83, Cl. D7-395.000.
Hees, Peggy J., to Milton Bradley International, Inc. Toy puzzle. 271,898., 12-20-83, Cl. D21-105.000.
Hernandez, Ernest. Support for concrete reinforcement bar. 271,846., 12-20-83, Cl. D8-356.000.
Hernandez, Ernest. Concrete reinforcement bar support. 271,847., 12-20-83, Cl. D8-356.000.
Hillesheim, Maurice G. Game paddle. 271,899., 12-20-83, Cl. D21-211.000.
Hirsh Company: *See*—
Ferdinand, Irwin J.; Sylvan, Richard; and Peterson, Michael, 271,843., Cl. D8-312.000.
Hoff, Harvey B. Refrigerator with beverage dispenser. 271,877., 12-20-83, Cl. D15-81.000.
Honda Giken Kogyo Kabushiki Kaisha: *See*—
Morioka, Minoru; Omori, Yoshitaka; and Matsui, Mamoru, 271,865., Cl. D12-110.000.
Hull, James R. Bed. 271,826., 12-20-83, Cl. D6-81.000.
Hull, James R. Bed. 271,827., 12-20-83, Cl. D6-81.000.
Hunt, James R. Combined comb and sheath. 271,911., 12-20-83, Cl. D28-22.000.
Huntsinger, Daniel F. Cushion. 271,834., 12-20-83, Cl. D6-201.000.
Janda, George M., to GTE Automatic Electric Labs Inc. Wall telephone base housing. 271,872., 12-20-83, Cl. D14-61.000.
Kangas, Timothy J., to PACCAR Inc. Integral truck cab windshield roof and deflector unit. 271,864., 12-20-83, Cl. D12-96.000.
Kato, Takaharu, to Ricoh Company, Ltd. Camera. 271,881., 12-20-83, Cl. D16-6.000.
Katoh, Hisaaki: *See*—
Kojima, Yoshio; Nanba, Masumi; and Katoh, Hisaaki, 271,908., Cl. D26-3.000.
Kaufman, Jack W. Surgical bone burring bit rack. 271,903., 12-20-83, Cl. D24-31.000.
Kelson, Shirley J. P. Sewing aid. 271,821., 12-20-83, Cl. D3-18.000.
Kesling, Keith: *See*—
Gierschick, Walter K.; and Kesling, Keith, 271,873., Cl. D14-76.000.
Kimura, Keiu, to Osaka Grip Mfg. Co., Ltd. Combined bottle and support bracket therefor. 271,852., 12-20-83, Cl. D9-337.000.
Knutson, Lawrence M., to Decra Stone, Inc. Food bowl. 271,835., 12-20-83, Cl. D7-29.000.
Kojima, Yoshio; Nanba, Masumi; and Katoh, Hisaaki, to Tokyo Shibaura Denki Kabushiki Kaisha. Lamp. 271,908., 12-20-83, Cl. D26-3.000.
Kowalik, Marie P., to Florists' Transworld Delivery Association. Container for flowers, plants or the like. 271,863., 12-20-83, Cl. D11-152.000.
Kruckel, Peter A.; and Mock, Gerhard, to Schwan-Stabilo Schwanhausser GmbH & Co. Marking instrument. 271,889., 12-20-83, Cl. D19-43.000.
Kunz, Kendall C. Fire stop for use between wall studs. 271,849., 12-20-83, Cl. D8-384.000.
Kurpakus, Larry. Horseshoe. 271,912., 12-20-83, Cl. D30-35.000.
Lance, Mark A., to W. A. Deutsher Pty. Ltd. Tube clamp. 271,851., 12-20-83, Cl. D8-396.000.
Leviton Manufacturing Co., Inc.: *See*—
Doyle, Richard C.; Rivera, Lester; and Rosenbaum, Saul, 271,869., Cl. D13-30.000.
Litschi, Gerold, to Master Etching Machine Company. Exposure unit for lithographic plates. 271,883., 12-20-83, Cl. D16-33.000.
Ma, Hansan, to Milton Bradley International, Inc. Stacking toy. 271,897., 12-20-83, Cl. D21-104.000.
Mallory, Henry R., to Duracell Inc. Fluorescent lantern. 271,909., 12-20-83, Cl. D26-42.000.
Martin, Walter S.; and Terrell, Cleo B., to Martin, Walter S. Can lid. 271,858., 12-20-83, Cl. D9-447.000.
Massaro, Jon. Heliodon-type device. 271,824., 12-20-83, Cl. D6-27.000.
Master Etching Machine Company: *See*—
Litschi, Gerold, 271,883., Cl. D16-33.000.
Mathews, Arlene L. Combined soap and rag holder. 271,829., 12-20-83, Cl. D6-89.000.
Matsuda, Mutsuhide: *See*—
Agou, Nobuhiro; and Matsuda, Mutsuhide, 271,880., Cl. D16-1.000.
Matsui, Mamoru: *See*—
Morioka, Minoru; Omori, Yoshitaka; and Matsui, Mamoru, 271,865., Cl. D12-110.000.
Matsuo, Yoshihiko; and Shohoji, Takeshi, to Ryobi Limited. Door closer. 271,845., 12-20-83, Cl. D8-330.000.
McGain, Peter D. Support bracket for a flower pot or similar article. 271,831., 12-20-83, Cl. D6-137.000.
Metal Box Limited: *See*—
Berry, Christopher, 271,854., Cl. D9-351.000.
Miller, Allen D.: *See*—
Suhajda, John I.; Corba, Robert E.; Davenport, Richard L.; and Miller, Allen D., 271,856., Cl. D9-375.000.
Milton Bradley International, Inc.: *See*—
Hees, Peggy J., 271,898., Cl. D21-105.000.
Ma, Hansan, 271,897., Cl. D21-104.000.
Mock, Gerhard: *See*—
Kruckel, Peter A.; and Mock, Gerhard, 271,889., Cl. D19-43.000.
Morioka, Minoru; Omori, Yoshitaka; and Matsui, Mamoru, to Honda Giken Kogyo Kabushiki Kaisha. Motorcycle. 271,865., 12-20-83, Cl. D12-110.000.
Nanba, Masumi, to Tokyo Shibaura Denki Kabushiki Kaisha. Compact fluorescent lamp. 271,907., 12-20-83, Cl. D26-3.000.
Nanba, Masumi: *See*—
Kojima, Yoshio; Nanba, Masumi; and Katoh, Hisaaki, 271,908., Cl. D26-3.000.
Nanfito, Joann K.: *See*—
Nanfito, William J.; and Nanfito, Joann K., 271,913., Cl. D32-55.000.
Nanfito, William J.; and Nanfito, Joann K. Baby bottle drying rack. 271,913., 12-20-83, Cl. D32-55.000.
Neilson, David R. Housing for pneumatic separator. 271,879., 12-20-83, Cl. D15-147.000.
Nickerson, L. Douglas. Splitting head for a wood splitting machine. 271,842., 12-20-83, Cl. D8-47.000.
Nippon Kogaku K.K.: *See*—
Giugiaro, Giorgetto, 271,885., Cl. D16-133.000.
Okada, Donald. Combined vase and support bracket therefor. 271,833., 12-20-83, Cl. D6-182.000.
Omori, Yoshitaka: *See*—
Morioka, Minoru; Omori, Yoshitaka; and Matsui, Mamoru, 271,865., Cl. D12-110.000.
Osaka Grip Mfg. Co., Ltd.: *See*—
Kimura, Keiu, 271,852., Cl. D9-337.000.
PACCAR Inc.: *See*—
Kangas, Timothy J., 271,864., Cl. D12-96.000.
Patton, Frederick K. Sign. 271,861., 12-20-83, Cl. D10-114.000.
Pearson, Clark: *See*—
Wolf, Gregory; Sandman, Scott; and Pearson, Clark, 271,828., Cl. D6-86.000.
Peterson, Michael: *See*—
Ferdinand, Irwin J.; Sylvan, Richard; and Peterson, Michael, 271,843., Cl. D8-312.000.

Polson, William. Combined inside and outside thermometer. 271,859., 12-20-83, Cl. D10-58.000.
Powers, Robert M., to Amway Corporation. Invertible casserole-rooster or the like. 271,839., 12-20-83, Cl. D7-327.000.
Powers, Robert M., to Amway Corporation. Roaster. 271,840., 12-20-83, Cl. D7-360.000.
Presto Lock, Inc.: *See*—
Stolarz, Edward M., 271,844., Cl. D8-321.000.
Quaker Oats Company, The: *See*—
Wilkes, Kenneth R., 271,896., Cl. D21-87.000.
Reinke, Wolfgang, to Esselte Pendalfex Corporation. Handle for a labelling apparatus. 271,886., 12-20-83, Cl. D18-19.000.
Renteria, William J., to Atari, Inc. Video game console. 271,891., 12-20-83, Cl. D21-13.000.
Rhomberg, Jane E. Baby shoe. 271,819., 12-20-83, Cl. D2-278.000.
Richter, Volker: *See*—
Schoettle, Klaus; Richter, Volker; and Wittkamp, Heinrich, 271,870., Cl. D14-11.000.
Ricoh Company, Ltd.: *See*—
Kato, Takaharu, 271,881., Cl. D16-6.000.
Rivera, Lester: *See*—
Doyle, Richard C.; Rivera, Lester; and Rosenbaum, Saul, 271,869., Cl. D13-30.000.
Rogers, David, to Textron Inc. Fork or similar article of flatware. 271,838., 12-20-83, Cl. D7-137.000.
Rosenbaum, Saul: *See*—
Doyle, Richard C.; Rivera, Lester; and Rosenbaum, Saul, 271,869., Cl. D13-30.000.
Rosti Plastic A/S: *See*—
Hansen, Erik L., 271,841., Cl. D7-395.000.
Runions, William E. Bingo-card holder. 271,895., 12-20-83, Cl. D21-54.000.
Ryobi Limited: *See*—
Matsuo, Yoshihiko; and Shohoji, Takeshi, 271,845., Cl. D8-330.000.
S. C. Johnson & Son, Inc.: *See*—
Suhajda, John I.; Corba, Robert E.; Davenport, Richard L.; and Miller, Allen D., 271,856., Cl. D9-375.000.
Sandman, Scott: *See*—
Wolf, Gregory; Sandman, Scott; and Pearson, Clark, 271,828., Cl. D6-86.000.
Schoettle, Klaus; Richter, Volker; and Wittkamp, Heinrich. Magnetic tape cassette. 271,870., 12-20-83, Cl. D14-11.000.
Schwan-Stabilo Schwanhausser GmbH & Co.: *See*—
Kruckel, Peter A.; and Mock, Gerhard, 271,889., Cl. D19-43.000.
Shimizu, Yoshiharu, to Arrow Trading Co., Inc. Combined telephone handset and base therefor. 271,871., 12-20-83, Cl. D14-53.000.
Shohoji, Takeshi: *See*—
Matsuo, Yoshihiko; and Shohoji, Takeshi, 271,845., Cl. D8-330.000.
Silbernagel, Frederick J. Front discharge mixer truck with auxiliary rear axle. 271,875., 12-20-83, Cl. D15-19.000.
Sims, Frank. Game board. 271,894., 12-20-83, Cl. D21-34.000.
Smith, Donald B. Collapsible article support or similar article. 271,832., 12-20-83, Cl. D6-180.000.
Snodgrass, Warren H. Chair. 271,825., 12-20-83, Cl. D6-69.000.
Stolarz, Edward M., to Presto Lock, Inc. Handle stud for an article of luggage or the like. 271,844., 12-20-83, Cl. D8-321.000.
Suhajda, John I.; Corba, Robert E.; Davenport, Richard L.; and Miller, Allen D., to S. C. Johnson & Son, Inc. Bottle. 271,856., 12-20-83, Cl. D9-375.000.
Sylvan, Richard: *See*—
Ferdinand, Irwin J.; Sylvan, Richard; and Peterson, Michael, 271,843., Cl. D8-312.000.
Tappan Company, The: *See*—
Wolf, Gregory; Sandman, Scott; and Pearson, Clark, 271,828., Cl. D6-86.000.
Tchemeshoff Associates, Inc.: *See*—
Tchemeshoff, John K., 271,848., Cl. D8-373.000.
Tchemeshoff, John K., to Tchemeshoff Associates, Inc. Tamper-proof fastening device for tags and the like. 271,848., 12-20-83, Cl. D8-373.000.
Terrell, Cleo B.: *See*—
Martin, Walter S.; and Terrell, Cleo B., 271,858., Cl. D9-447.000.
Textron Inc.: *See*—
Rogers, David, 271,838., Cl. D7-137.000.
Thomson-CSF: *See*—
Endt, Evert, 271,874., Cl. D14-113.000.
Thrush, James L., to Anchor Hocking Corporation. Bottle or the like. 271,855., 12-20-83, Cl. D9-370.000.
Tokyo Shibaura Denki Kabushiki Kaisha: *See*—
Kojima, Yoshio; Nanba, Masumi; and Katoh, Hisaaki, 271,908., Cl. D26-3.000.
Nanba, Masumi, 271,907., Cl. D26-3.000.
Tsuno, Tokumitsu, to Yakult Honsha Co., Ltd. Bottle. 271,853., 12-20-83, Cl. D9-349.000.
Tucker, Annabelle D. Angio-catheter/infusion tubing lock. 271,904., 12-20-83, Cl. D24-54.000.
Turkington, Mark; and Turkington, Philip, to Connecticut Cycle Accessories, Inc. Combined sissy bar and backrest pad. 271,866., 12-20-83, Cl. D12-119.000.
Turkington, Philip: *See*—
Turkington, Mark; and Turkington, Philip, 271,866., Cl. D12-119.000.
U.S. Philips Corporation: *See*—
Zabransky, Fritz E., 271,906., Cl. D26-2.000.
Voytko, Charles L.; and Boudreau, Robert J., to Brown Group Recreational Products, Inc. Collapsible stroller. 271,868., 12-20-83, Cl. D12-129.000.
W. A. Deutsher Pty. Ltd.: *See*—
Lance, Mark A., 271,851., Cl. D8-396.000.
Waites, Raymond, to Gear, Inc. Duffel satchel. 271,823., 12-20-83, Cl. D3-71.000.
Waslander, Donald, to Essilor International (Compagnie Generale d'Optique). Optical measuring instrument. 271,901., 12-20-83, Cl. D24-1.100.
Wilkes, Kenneth R., to Quaker Oats Company, The. Space toy. 271,896., 12-20-83, Cl. D21-87.000.
Williams, Caldwell, to Williams, Caldwell. Book cover. 271,887., 12-20-83, Cl. D19-26.000.
Wirken, Frank J. Casino game board. 271,893., 12-20-83, Cl. D21-26.000.
Wittkamp, Heinrich: *See*—
Schoettle, Klaus; Richter, Volker; and Wittkamp, Heinrich, 271,870., Cl. D14-11.000.
Wolf, Gregory; Sandman, Scott; and Pearson, Clark, to Tappan Company, The. Toilet-bidet cabinet. 271,828., 12-20-83, Cl. D6-86.000.
Yakult Honsha Co., Ltd.: *See*—
Tsuno, Tokumitsu, 271,853., Cl. D9-349.000.
Zabransky, Fritz E., to U.S. Philips Corporation. Lamp. 271,906., 12-20-83, Cl. D26-2.000.

LIST OF PLANT PATENTEES

Duffett, William E., to Yoder Brothers, Inc. Chrysanthemum plant. 5,163., 12-20-83, Cl. 76.000.
L. Daehnfeldt Ltd.: *See*—
Schelbeck, Erland V., 5,162., Cl. 68.000.
Mikkelsen, James C., to Mikkelsens, Inc. Kalanchoe plant named Cinnabar. 5,160., 12-20-83, Cl. 68.000.
Mikkelsen, James C., to Mikkelsens, Inc. Begonia plant named Lyric. 5,161., 12-20-83, Cl. 68.000.
Mikkelsens, Inc.: *See*—
Mikkelsen, James C., 5,160., Cl. 68.000.
Mikkelsen, James C., 5,161., Cl. 68.000.
National Seed Development Organisation Limited: *See*—
Tydeman, Henry M., deceased; and Tydeman, William M., executor, 5,159., Cl. 37.000.
Schelbeck, Erland V., to L. Daehnfeldt Ltd. Begonia plant named Dorthe. 5,162., 12-20-83, Cl. 68.000.
Tydeman, Elizabeth M., executor: *See*—
Tydeman, Henry M., deceased; and Tydeman, William M., executor, 5,159., Cl. 37.000.
Tydeman, Henry M., deceased (by Tydeman, Elizabeth M., executor); and by Tydeman, William M., executor, to National Seed Development Organisation Limited. Cherry rootstock—cob variety. 5,159., 12-20-83, Cl. 37.000.
Tydeman, William M., executor: *See*—
Tydeman, Henry M., deceased; and Tydeman, William M., executor, 5,159., Cl. 37.000.
Yoder Brothers, Inc.: *See*—
Duffett, William E., 5,163., Cl. 76.000.

CLASSIFICATION OF PATENTS

ISSUED DECEMBER 20, 1983

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2
161 A 4,420,843

CLASS 4
295 4,420,844
366 4,420,845
542 4,420,846

CLASS 5
490 4,420,847

CLASS 8
130.1 4,421,513
137 4,421,514
444 4,421,515
464 4,421,516
471 4,421,517
4,421,518
644 4,421,519

CLASS 10
72 R 4,420,848

CLASS 14
71.3 4,420,849

CLASS 15
21 R 4,420,850
22 R 4,420,851
104.3 SN 4,420,852
111 4,420,853
302 4,420,854

CLASS 17
1 E 4,420,855
34 4,420,856

CLASS 24
16 PB 4,420,857
170 4,420,858
585 4,420,859
613 4,420,860

CLASS 28
196 4,420,861

CLASS 29
24.5 4,420,862
121.5 4,420,863
263 4,420,864
402.19 4,420,865
421 R 4,420,866
4,420,867
460 4,420,868
4,420,869
571 4,420,870
4,420,871
4,420,872
576 E 4,420,873
576 W 4,420,874
597 4,420,875
611 4,420,876
739 4,420,877
741 4,420,878
764 4,420,879
4,420,880
825 4,420,881
837 4,420,882

CLASS 30
251 4,420,883
266 4,420,884
381 4,420,885

CLASS 33
1 M 4,420,886
147 F 4,420,887
172 R 4,420,888
178 F 4,420,889
180 R 4,420,890
476 4,420,891

CLASS 34
183 4,420,892

CLASS 36
3 R 4,420,893
12 4,420,894
118 4,420,895

CLASS 40
427 4,420,896
4,420,897
570 4,420,898

CLASS 42
70 A 4,420,899

CLASS 43
17 4,420,900

CLASS 44
6 4,421,520
16 R 4,421,521
53 4,421,522

CLASS 47
1.44 4,420,901
66 4,420,902
81 4,420,903
4,420,904

CLASS 48
197 R 4,421,523
209 4,421,524

CLASS 49
192 4,420,905
352 4,420,906
446 4,420,907

CLASS 51
73 R 4,420,909
165.88 4,420,910
170 T 4,420,908
216 R 4,420,911
227 R 4,420,912
295 4,421,525
296 4,421,526
308 4,421,527
309 4,421,528

CLASS 52
57 4,420,913
80 4,420,914
98 4,420,915
122.1 4,420,916
123.1 4,420,917
157 4,420,918
204 4,420,919
309.15 4,420,920
749 4,420,921
791 4,420,922

CLASS 53
51 4,420,923
307 4,420,924

CLASS 55
16 4,421,529
26 4,421,530
4,421,531
28 4,421,532
68 4,421,533
73 4,421,534

CLASS 56
10.3 Re.31,464
15.9 4,420,925

CLASS 57
100 4,420,926
288 4,420,927
401 4,420,928

CLASS 60
39.06 4,420,929
39.461 4,420,930
219 4,420,931
230 4,420,932
302 4,420,933
422 4,420,934
427 4,420,935
431 4,420,936
450 4,420,937
641.12 4,420,939
641.5 4,420,938

CLASS 62
3 4,420,940
17 4,421,535
18 4,421,536
22 4,421,537
53 4,420,942
81 4,420,943
86 4,420,944
4,420,945
101 4,420,946
160 4,420,947
340 4,420,948
354 4,420,949
402 4,420,941
4,420,950

CLASS 65
1 4,421,538
3.12 4,421,539
4,421,540
99.3 Re.31,466
4,421,541
158 4,421,542

CLASS 68
17 R 4,420,951
53 4,420,952

CLASS 70
74 4,420,953
150 4,420,954
303 A 4,420,955
312 4,420,956

CLASS 71
5 4,421,543
7 4,421,544
30 4,421,545
66 4,421,546
86 4,421,547
4,421,548
87 4,421,549
92 4,421,550

CLASS 72
1 4,420,957
21 4,420,958
113 4,420,959
202 4,420,960
221 4,420,961
360 4,420,962
407 4,420,963
451 4,420,964

CLASS 73
28 4,420,966
35 4,420,967
4,420,968
40 4,420,969
46 4,420,970
118 4,420,971
4,420,972
119 A 4,420,973
154 4,420,974
155 4,420,975
304 C 4,420,976
505 4,420,977
643 4,420,978
644 4,420,979
730 4,420,980
756 4,420,981
861.12 4,420,982
861.18 4,420,983
862.59 4,420,984
862.66 4,420,985

CLASS 74
60 4,420,986
99 A 4,420,987
501.5 R 4,420,988
551.2 4,420,989
606 R 4,420,990
682 4,420,991
781 R 4,420,992
785 4,420,993
867 4,420,994

CLASS 75
0.5 B 4,421,551
9 4,421,552
41 4,421,553
52 4,421,554
53 4,421,555
63 4,421,556
125 4,421,557
128 E 4,421,558

CLASS 81
60 4,420,995

CLASS 83
13 4,420,996
105 4,420,997
328 4,420,998
345 4,420,999
372 4,421,000

CLASS 84
1.17 4,421,001
4,421,002
1.26 4,421,003

CLASS 86
20 D 4,421,004

CLASS 89
1 A 4,421,007
1 B 4,421,005
1 K 4,421,006
33 CA 4,421,008
140 4,421,009

CLASS 91
375 R 4,421,010
380 4,421,011
388 4,421,012

CLASS 98
55 4,421,013

CLASS 99
289 P 4,421,014
332 4,421,015
402 4,421,016
421 R 4,421,017
447 4,421,018
450.4 4,421,019
472 4,421,020
504 4,421,021

CLASS 100
98 R 4,421,022

CLASS 101
45 4,421,023
93.04 4,421,025
136 4,421,026
142 4,421,027
240 4,421,028
415.1 4,421,024

CLASS 102
207 4,421,029
218 4,421,030
252 4,421,031
307 4,421,032
529 4,421,033

CLASS 104
9 4,421,034

CLASS 106
20 4,421,559
21 4,421,560
27 4,421,561
75 4,421,562
100 4,421,563
154 R 4,421,564
180 4,421,565
213 4,421,566

CLASS 108
6 4,421,035

CLASS 110
186 4,421,036
238 4,421,037
245 4,421,038
263 4,421,039
294 4,421,040

CLASS 112
226 4,421,041
259 4,421,042
260 4,421,043
262.3 4,421,044
288 4,421,045
292 4,421,046
311 4,421,047

CLASS 114
222 4,421,048
245 4,421,049
256 4,421,050
264 4,421,051

CLASS 116
34 R 4,421,052
218 4,421,053

CLASS 118
63 4,421,054
620 4,421,055
645 4,421,056
657 4,421,057

CLASS 119
19 4,421,058
51.12 4,421,059
72.5 4,421,060
81 4,421,061

CLASS 122
1 R 4,421,062
4 D 4,421,063
15 4,421,064
155 R 4,421,065
264 4,421,066
390 4,421,067
448 B 4,421,068
487 4,421,069
510 4,421,070

CLASS 123
1 A 4,421,071
4,421,072
43 R 4,421,073
90.15 4,421,074
142.5 R 4,421,075
179 L 4,421,076
190 BD 4,421,077
196 R 4,421,078
255 4,421,079
306 4,421,080
310 4,421,081
333 4,421,082
339 4,421,083
365 4,421,084
416 4,421,085
425 4,421,086
445 4,421,087
447 4,421,088
454 4,421,089
557 4,421,090
620 4,421,091

CLASS 124
41 A 4,421,092
86 4,421,093

CLASS 126
61 4,421,094
91 R 4,421,095
285 B 4,421,096
422 4,421,097
429 4,421,098
433 4,421,099
435 4,421,100
436 4,421,101
438 4,421,102
4,421,104
452 4,421,105

CLASS 127
46.3 4,421,567
48 4,421,568

CLASS 128
4 4,421,106
6 B1 4,216,767
20 4,421,107
4,421,108
25 R 4,421,109
60 4,421,110
91 A 4,421,111
92 EB 4,421,112
204.23 4,421,113
419 F 4,421,115
419 PG 4,421,114
4,421,116
555 4,421,117
660 4,421,118
4,421,119
725 4,421,120
731 4,421,121
4,421,122
766 4,421,123
782 4,421,124

CLASS 131
276 4,421,125
371 4,421,126

CLASS 132
83 R 4,421,127
88.5 4,421,128
163 4,421,129

CLASS 134
76 4,421,130
104 4,421,131
123 4,421,132

CLASS 135
22 4,421,133
102 Re.31,465

CLASS 136
217 4,421,942
246 4,421,943

CLASS 137
72 4,421,134
312 4,421,135
340 4,421,136

CLASS 138
89 4,421,137
4,421,138
4,421,139

CLASS 139
1 E 4,421,140
54 4,421,141
117 4,421,142
341 4,421,143
370.2 4,421,144

CLASS 140
104 4,421,145

CLASS 141
349 4,421,146
362 4,421,147
392 4,421,148

CLASS 144
366 4,421,149

CLASS 148
6.14 R 4,421,569
11.5 C 4,421,570
11.5 R 4,421,571
12 E 4,421,572
12 F 4,421,573
111 4,421,574
153 4,421,575
175 4,421,576
187 4,421,577

CLASS 149
2 4,421,578

CLASS 152
417 4,421,151

CLASS 156
60 4,421,579
69 4,421,580
71 4,421,581
86 4,421,582
167 4,421,583
178 4,421,584
209 4,421,585
247 4,421,586
256 4,421,587
308.2 4,421,588
382 4,421,589
506 4,421,590
508 4,421,591
613 4,421,592
643 4,421,593

CLASS 159
4 R 4,421,594

CLASS 162
23 4,421,595
30.11 4,421,596
47 4,421,597
88 4,421,598
100 4,421,599
111 4,421,600
162 4,421,601
168.2 4,421,602

CLASS 164

35 4,421,153
158 4,421,154
258 4,421,152
444 4,421,155

CLASS 165

1 4,421,156
4 4,421,157
40 4,421,158
44 4,421,159
76 4,421,160
80 C 4,421,161
140 4,421,162

CLASS 166

59 4,421,163
118 4,421,164
151 4,421,165
162 4,421,166
255 4,421,167
273 4,421,168
285 4,421,169
312 4,421,170
331 4,421,171
334 4,421,172
336 4,421,173
374 4,421,174
383 4,421,175

CLASS 172

41 4,421,176
63 4,421,177
548 4,421,178

CLASS 173

44 4,421,179
124 4,421,180
162 H 4,421,181

CLASS 174

68.5 4,421,944
92 4,421,945
114 4,421,183
128 S 4,421,946
152 GM 4,421,947
158 R 4,421,948

CLASS 175

65 4,421,182
337 4,421,184

CLASS 177

25 4,421,185
139 4,421,186

CLASS 179

2 DP 4,421,950
4,421,951
2 EA 4,421,952
2 EC 4,421,953
6.13 4,421,954
18 EA 4,421,955
120 4,421,956
121 D 4,421,957

CLASS 180

8 A 4,421,189
73 D 4,421,187
90 4,421,190
132 4,421,191
179 4,421,192
192 4,421,193
215 4,421,194
228 4,421,195
257 4,421,196
258 4,421,197
327 4,421,188

CLASS 181

121 4,421,198
136 4,421,199
144 4,421,200
214 4,421,201
252 4,421,202
284 4,421,203

CLASS 182

50 4,421,204
82 4,421,205
156 4,421,206

CLASS 185

29 4,421,207

CLASS 187

9 E 4,421,208
9 R 4,421,209

CLASS 188

32 4,421,210
79.5 K 4,421,211
152 4,421,212
296 4,421,213

CLASS 192

0.098 4,421,217
4 A 4,421,214
4,421,215
58 B 4,421,216
106 F 4,421,218

CLASS 194

1 L 4,421,219
4 D 4,421,220

CLASS 198

345 4,421,225
372 4,421,221
382 4,421,222
534 4,421,226
604 4,421,223
781 4,421,224
800 4,421,227
814 4,421,228

CLASS 200

5 A 4,421,958
16 A 4,421,959
61.54 4,421,960
144 AP 4,421,962
144 B 4,421,961
147 R 4,421,963
157 4,421,964
175 4,421,965
309 4,421,966

CLASS 201

1 4,421,604
12 4,421,603

CLASS 202

181 4,421,605

CLASS 203

10 4,421,606
60 4,421,607

CLASS 204

12 4,421,608
16 4,421,609
35 N 4,421,610
43 T 4,421,611
58 4,421,612
74 4,421,613
98 4,421,614
105 R 4,421,615
115 4,421,616
157.1 R 4,421,617
158 R 4,421,618
159.16 4,421,619
181 C 4,421,620
192 C 4,421,621
192 P 4,421,622
206 4,421,623
209 4,421,624
243 R 4,421,625
290 R 4,421,626
297 W 4,421,627
298 4,421,628

CLASS 206

44 R 4,421,229
378 4,421,230
388 4,421,231
434 4,421,232
503 4,421,233
509 4,421,234
524.2 4,421,235
621 4,421,236

CLASS 208

8 LE 4,421,630
8 R 4,421,629
4,421,631
10 4,421,632
59 4,421,633
111 4,421,634
112 4,421,635
113 4,421,636
120 4,421,637
251 R 4,421,638
309 4,421,639
326 4,421,640

CLASS 209

166 4,421,641
384 4,421,642
612 4,421,237

CLASS 210

138 4,421,643
233 4,421,644
260 4,421,645
291 4,421,646
387 4,421,647
605 4,421,648
634 4,421,649
635 4,421,650
672 4,421,651
687 4,421,652
692 4,421,653
698 4,421,654

CLASS 211

60 G 4,421,240
87 4,421,238
187 4,421,239

CLASS 212

186 4,421,241
218 4,421,242

CLASS 219

10.51 4,421,967
10.55 F 4,421,968
107 4,421,969
121 PV 4,421,970
128 4,421,971
137 PS 4,421,972
301 4,421,973
441 4,421,974
506 4,421,976

CLASS 220

1.5 4,421,243
306 4,421,244
307 4,421,246
328 4,421,245
354 4,421,247

CLASS 222

25 4,421,248
88 4,421,249
95 4,421,250
99 4,421,251
102 4,421,252
105 4,421,253
180 4,421,254
387 4,421,255
600 4,421,256
4,421,257

CLASS 223

75 4,421,258
76 4,421,259

CLASS 224

42.43 4,421,260

CLASS 226

74 4,421,261
79 4,421,262
143 4,421,263

CLASS 227

2 4,421,264

CLASS 228

180 A 4,421,266
180 R 4,421,265

CLASS 229

44 R 4,421,267

CLASS 235

101 4,421,977
462 4,421,978

CLASS 236

10 4,421,268
12.12 4,421,269
20 R 4,421,270
82 4,421,271

CLASS 238

8 4,421,272

CLASS 239

4,421,273
183 4,421,274
226 4,421,275
273 4,421,276
456 4,421,277
533.12 4,421,278
546 4,421,279
585 4,421,280
690 4,421,281

CLASS 242

18 G 4,421,282
56.9 4,421,283
158 R 4,421,284
221 4,421,285

CLASS 244

116 4,421,286
223 4,421,287

CLASS 248

206 R 4,421,288
246 4,421,289
558 4,421,290
635 4,421,291

CLASS 249

335 4,421,975

CLASS 250

227 4,421,979
231 SE 4,421,980
253 4,421,981
260 4,421,982
339 4,421,983
4,421,984
353 4,421,985
369 4,421,986
492.1 4,421,987
492.2 4,421,988

CLASS 251

60 4,421,292
61.4 4,421,293
86 4,421,294
4,421,295
149.7 4,421,296
310 4,421,297
368 4,421,298

CLASS 252

8.5 M 4,421,655
8.5 P 4,421,656
8.6 4,421,657
32.7 E 4,421,658
33 4,421,659
62.54 4,421,660
70 4,421,661
4,421,662
74 4,421,663
94 4,421,664
106 4,421,665
140 4,421,666
156 4,421,667
174.12 4,421,668
186.25 4,421,669
299.62 4,421,670
301.4 F 4,421,671
501.1 4,421,677
511 4,421,678
522 R 4,421,679
526 4,421,680
541 4,421,681

CLASS 254

88 4,421,300
134.3 R 4,421,301
342 4,421,299

CLASS 256

67 4,421,302

CLASS 260

112 B 4,421,684
112 R 4,421,682
4,421,683
112.7 4,421,685
239 A 4,421,686
239.3 B 4,421,687
4,421,688
395 Re.31,467
397.1 4,421,690
410.9 R 4,421,691
4,421,692
464 4,421,693
465 E 4,421,694
974 4,421,695

CLASS 261

109 4,421,303
123 4,421,696

CLASS 264

30 4,421,697
40.1 4,421,698
56 4,421,699
59 4,421,700
60 4,421,701
62 4,421,702
68 4,421,703
133 4,421,704
153 4,421,705
157 4,421,706
182 4,421,707
206 4,421,708
216 4,421,709
228 4,421,710
529 4,421,711
551 4,421,712

CLASS 266

103 4,421,304

CLASS 269

287 4,421,305

CLASS 271

5 4,421,306

CLASS 272

72 4,421,307
73 4,421,308

CLASS 273

51 4,421,309
143 R 4,421,310
153 S 4,421,311
236 4,421,312
237 4,421,313
249 4,421,314
268 4,421,315
274 4,421,316
313 4,421,317
395 4,421,318
416 4,421,319
425 4,421,320

CLASS 277

3 4,421,321
12 4,421,322
4,421,323
24 4,421,324
27 4,421,325
50 4,421,326
84 4,421,327
178 4,421,329
188 R 4,421,330
216 4,421,328

CLASS 280

81 R 4,421,331
95 R 4,421,332
154.5 R 4,421,333
236 4,421,334
247 4,421,335
252 4,421,336
277 4,421,337
279 4,421,338
460 R 4,421,339
478 B 4,421,340
628 4,421,341
740 4,421,342
752 4,421,343

CLASS 282

27.5 4,421,344

CLASS 285

223 4,421,345
346 4,421,346
369 4,421,347

CLASS 290

40 R 4,421,989
53 4,421,990
4,421,991

CLASS 292

19 4,421,349
123 4,421,350
339 4,421,348

CLASS 293

132 4,421,351

CLASS 294

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D2—	278	271,819		201	271,834		396	271,851			271,867		33	271,883		211	271,899
	400	271,820	D7—	29	271,835	D9—	337	271,852		129	271,868		116	271,884	D23—	138	271,900
D3—	18	271,821		42	271,836		349	271,853	D13—	30	271,869		133	271,885	D24—	1.1	271,901
	33	271,822		137	271,838		351	271,854	D14—	11	271,870	D18—	19	271,886		09	271,902
	71	271,823		327	271,839		370	271,855		53	271,871	D19—	26	271,887		31	271,903
				360	271,840		375	271,856		61	271,872		34	271,888		54	271,904
D6—	27	271,824		395	271,841		438	271,857		76	271,873		43	271,889			
	69	271,825		47	271,842		447	271,858		113	271,874	D21—	6	271,890	D25—	74	271,905
	81	271,826		312	271,843	D10—	58	271,859	D15—	19	271,875		13	271,891	D26—	2	271,906
		271,827		321	271,844		96	271,860		23	271,876		25	271,892		3	271,907
	86	271,828		330	271,845		114	271,861		81	271,877		26	271,893			271,908
	89	271,829		356	271,846	D11—	105	271,862		138	271,878		34	271,894		42	271,909
	127	271,830			271,847		152	271,863		147	271,879		54	271,895	D28—	8.1	271,910
	137	271,831		373	271,848	D12—	96	271,864	D16—	1	271,880		87	271,896		22	271,911
	180	271,832		384	271,849		110	271,865		6	271,881		104	271,897	D30—	35	271,912
	182	271,833		395	271,850		119	271,866		32	271,882		105	271,898	D32—	55	271,913

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